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WINTER WORK

Section begins on page 59

magazine of modern construction

Building Good Roads

with low-cost gravel and Texaco Asphalt

Photographs

1. Road-mixing machine picks up gravel from windrow, blends it uniformly with Texaco Slow-curing Asphaltic Oil and deposits mix in another windrow.

2. A power grader is used to spread the asphalt-gravel mix over the full width of the road to the desired thickness.

3. Multi-wheel rollers, as well as a conventional steel wheel roller, were used to compact the Texaco Asphalt wearing surface.

4. Completed Todd County road illustrates results obtainable with low-cost gravel and Texaco Asphaltic products.

CONTRACTOR . . . Roland M. Starry, Long Prairie, Minn.

Any county or municipality favored with an ample supply of local gravel can build good roads at low cost by following the example of Todd County, Minn.

In the road project illustrated above, Todd County used inexpensive gravel both as a base and as the aggregate in a road-mix type of Texaco Asphalt wearing surface. The result is a highway capable of serving fairly heavy traffic for years, with an occasional bituminous seal coat.

The waterbound gravel base was laid in two courses to a compacted thickness of 4 to 6 inches. Following this, Texaco Slow-curing Asphaltic Oil and gravel were blended uniformly on the base by mechanical mixer, spread by power grader and compacted to form a tough, waterproof surface 1½ inches thick.

Texaco Asphalt Cements, Cutback Asphalts and Slow-curing Asphaltic Oils have provided a wide range of answers to the road building problem for half a century. Helpful information on all types of asphalt road and street improvements, from heavy-duty paving to dust laying, is supplied in two free booklets. Copies can be obtained without obligation by writing our nearest office.

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Contractors and Engineers

magazine of modern construction

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Field Editors, **Ralph Monson, Anthony N. Mavroudis** — Contributing Editor, **Ray Day**
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EDITORIAL

Cold weather construction

According to The Associated General Contractors of America, both the immediate and long-range prospects are for a continued volume of construction at record levels. For the first eight months of this year, the volume of new construction was 13 per cent ahead of the same period last year. For the full year, the AGC expects the volume of new construction to approach $42 billion, about $4 billion more than the 1954 record level. Including maintenance and repair, the total volume of construction activity for 1955 may well reach $58 billion.

The Twentieth Century Fund, in its latest survey of America's resources and needs, anticipates higher and higher construction levels for at least the next five years. Highway, heavy, and building construction are all on the increase. Road building, in particular, should soon be in its greatest era. To handle this big volume, the construction industry must prepare to do more and more work during the so-called off-season. The spring, summer, and fall in northern climes simply do not include enough days to complete necesary projects. Contractors must learn to employ new techniques and materials to keep working during cold winter weather.

From a social viewpoint, spreading work over the year should be a boon to a contractor's organization. Construction firms usually lay off the bulk of their personnel when winter comes, keeping only a relatively few key men on the payroll. If they can assure crews of year-round steady employment, they could possibly arrange for wage rates more realistic than those now in force. And when contractors get enough jobs to keep busy throughout the year, they can adjust their per cent of profit to the advantage of the owner or client.

Anticipating a trend toward increased construction activity during the winter months, we have given a section of this issue over to cold-weather construction. It starts on page 59 and covers both civil and military activities on various types of construction being done from Alaska and Greenland to the South Pole. The cold-weather jobs include bridge steel erection; equipment maintenance for the U. S. Corps of Engineers' base at Thule in the Arctic; winter work at a taconite-processing plant in the Lake Superior region; snow removal from Minnesota highways; laying a pipeline through permafrost and muskeg into the Alaskan interior; building concrete reservoirs at below-freezing temperatures; Operation Deepfreeze, the U. S. Navy Seabees' project in the Antarctic; and some tips on cold-weather blasting.

In addition to these eight stories, we are running over 40 separate items on some piece of equipment, material, or available literature that may prove of value in winter work. Tear out this cold weather construction section for your permanent file; if you expect to keep active in construction during the "off-season," it should prove helpful.

Don't overlook our Weather Charts on page 98. These maps indicate the kind of weather you might expect in each section of the United States next month. With a little study of probable cold-weather conditions, you can plan your work more accurately and profitably. The data for these charts is based on the records of 50 weather stations throughout the country, and go back 80 years. Thus the weather conditions they indicate will remain virtually unchanged for many years. Clip these too for future reference. Cold weather construction may well make the "off-season" a thing of the past.

NEWS AND VIEWS

In another 60 days, a report on plans for raising money for an enlarged highway program will be completed by the U. S. Bureau of Public Roads, and already congress is preparing to come to grips with the road-financing problem, which remains the same as it was at this year's adjournment. Of $8 billion being raised by highway taxes, $7.5 billion is being spent on roads, $4.6 billion of it in new construction. Even if all highway tax money were used for roads, as the AAA suggests, this sum would pay only half the bill for the program being championed by President Eisenhower. Questions of borrowing money through bonds, of paying for roads out of general funds, remain unsettled. One suggestion, somewhat surprising but worth consideration, comes from T. S. Petersen, president of the Standard Oil Co. of California, who suggested in a speech before the 53rd annual meeting of the National Petroleum Association that a broader tax base be used to include all who benefit directly or indirectly from public roads. This would not only include suppliers of all automotive products, and persons whose property had risen in value as a result of road construction, but also manufacturers of paving materials. This would include Petersen's own firm. The result, Petersen feels, would have a fairer share of the tax burden falling on the petroleum industry as a whole. The gas tax, he says, is high enough now for a "commodity not in the luxury class," and increases in it may prove harmful. He goes along with the proposal of Sen. Byrd, which has not won much support to date, that the federal government get out of the gas-tax field, leave it to the states, and support the road program from general funds.

Winter or early spring closing dates for the fiscal year fall naturally in winter or early spring for most contractors, according to a recent survey by the American Institute of Accountants. Their contention is that the close of a natural business year should be when inventories, receivables, and outstanding loans are at their lowest point in a 12-month period. This makes February the best month to end a fiscal year for building, general, and marine contractors, and March a good month to end the year for paving contractors. These are only suggested months, since climate and special characteristics of operation make individual companies vary.

Shooting, required for new elevator shaft and parking lot, is controlled to minimize vibration in limestone deposit

Blasts for park improvement leave facilities undamaged

The use of standard and short-period delay caps, and the careful control of the size and effect of each blast enabled a contractor to construct a new elevator shaft and parking lot at the Carlsbad Caverns National Park in New Mexico without damaging nearby existing elevators or rock formations. The new elevators, now in operation, transport 1,400 people to the caverns hourly, as compared with the capacity of 400 which the old elevators could handle. And the new parking lot, accommodating 410 automobiles, is the second big improvement at the park, which hundreds of thousands of people visit annually.

Blasting for the new elevator shaft was a particularly delicate operation, since ground vibration could easily have damaged rock formations in the caverns directly below. Most of the 754-foot-deep shaft, measuring 9 × 16 feet, was sunk from above by Boyles Brothers Drilling Co., Salt Lake City, Utah; only the last 60 feet of the shaft was cut out with raise rounds, the blasting being done less than 25 feet from existing and operating elevators and directly above the fragile rock formations in the caverns.

Regular wedge-type rounds were used for the new shaft. Line drilling was done on 3-inch centers on the side next to the existing elevators so that an opening was provided for the blast, and vibration through the rock was reduced. Atlas Gelodyn and Giant gelatin dynamites, together with standard delay electric blasting caps, were used exclusively to break the 3,500 cubic yards of rock which was removed for the shaft.

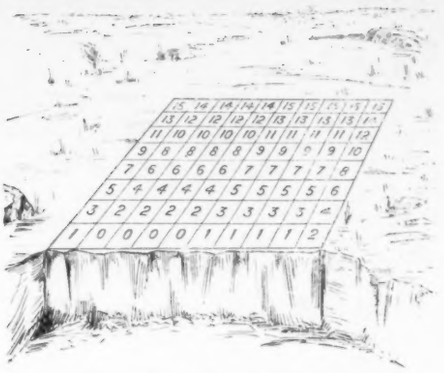
Blasting for parking area

A great deal of care was exercised in blasting rock for the new parking terrace—for two reasons. Even though the rock cover above the caverns is extensive, the limestone transmits shock readily and too large a blast would have damaged formations far below ground. Also, the park remained open to visitors during construction, and each blast had to be made so that rocks would not scatter over a wide area.

To break up rock for the 36,000-cubic-yard excavation required, Longenbaugh & Coe Construction Co., Albuquerque, N. Mex., used Atlas Rockmaster millisecond delay electric blasting caps to reduce the vibration. Millisecond delay patterns were arranged to control the direction of throw.

Holes were 2 and 2½ inches in diameter, spaced 4 × 4 feet, and ranged from 2 to 16 feet in depth. When blasts were set off, the 40 per cent Atlas Giant extra dynamite used, coupled with the split-second delay patterns, gave good fragmentation and controlled the throw.

THE END



Numbers in this sketch of a blasting pattern used for the parking terrace at Carlsbad Caverns, N. Mex., indicate the Atlas Rockmaster cap used. The total delay between the No. 0 and No. 16 cap is 0.550 second.

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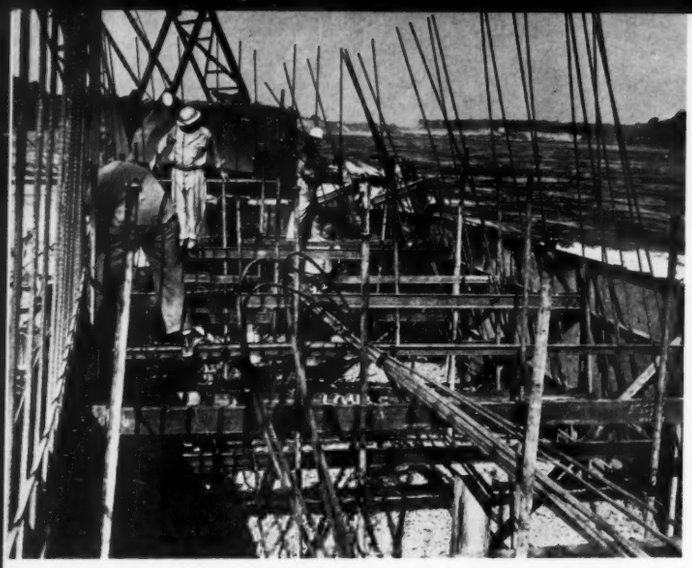

Ironworkers set reinforcing steel for the south pier of Barnhart Island Bridge. Mortar for consolidating the coarse aggregate into Prepakt concrete is pumped in through vertical pipes.

Bridge contractor battles 20-mile St. Lawrence current

Fighting a 20-mph current in the St. Lawrence River made building a pair of piers for the Barnhart Island Bridge one of the most difficult and hazardous undertakings on the St. Lawrence Power Development project. The $5 million span, being built in less than 14 months for the Power Authority of New York State, must be ready for use by December so that it can be used to transport equipment, materials, and personnel to and from the Barnhart Island Power Plant site.

Barnhart Island itself will play an important role in the project as a whole—that of central anchor for the entire power development. (See "Start is Made on St. Lawrence Power and Seaway Projects", C&E, October, 1955, pg. 30) At its lower end, the huge Barnhart Island Power Plant will extend completely across the main channel of the river to the Canadian shore, with Long Sault Dam, about two miles upstream, controlling the flow in the channel between the island and the American mainland. The island will serve as a dike between the two structures.

Before the St. Lawrence Seaway and Power Development projects were started, the island was accessible from either side only by water—the fast-flowing Long Sault Rapids of the St. Lawrence separating it from the American mainland and the main channel separating it from Canada.

When work started and two large cofferdams were constructed across the main channel, the flow of the river, rated at 260,000 cfs, was forced through the channel on the American side. Less than 1,000 feet wide, this is the channel which the bridge will span.

Had engineers been able to plan the sequence of operations for maximum convenience, the bridge would have been completed before the cofferdams closed the main river channel, so that the additional flow of water would not have been diverted until the bridge was finished. However, construction of the bridge would have taken a year, work on the Seaway and Power Developments had already been authorized, and construction of the main structures had to get under way immediately.

Meanwhile, a temporary floating bridge was located at Hawkins Point, downstream from the permanent bridge, to provide access to the island while the permanent bridge is being built. Since this structure might not be able to resist the heavy ice floes coming down the river during the winter and spring, it will be removed by December 1, when the permanent structure must be ready for service.

Build stone dikes

Work on the $2 million substructure contract for the permanent bridge was begun in October, 1954, by A. S. Wikstrom, Inc., Skaneateles, N. Y., and was completed in September,

Why this new ultra-modern in-line plant was developed

● Here it is . . . a gravel plant with a 1036 jaw crusher, 30" x 24" rolls, and a big 4'x12'—2½ deck vibrating screen, — *yet which weighs only 55,900 lbs. on the road* . . . a plant equipped with the most efficient mechanical drives ever devised for a portable plant . . . a plant which can be moved without dismantling!

In the past, highway load limits have been met in one of two ways . . . either by reducing the size of crushers, screens, and other units in order to save weight . . . or by dividing the plant into individually mounted primary and secondary plants.

In one case, capacity was sacrificed. In the other, portability was lost, cost was higher, and longer set-up time was needed at the pit.

Specially designed crushers, screens

To create the new 35-S, PIONEER engineers began by redesigning its basic units. They developed a new angle of tilt for the jaw crusher to improve feeding of oversize and make adjustment easier. The 1036 crusher, incidentally, is the largest used in any portable duplex gravel plant.

The specially designed 30" x 24" roll crusher is hydraulically adjusted and gives ⅓ *more crushing area.* A new-type 4'x12'—2½ deck vibrating screen and 30" conveyors, are as large as you'll find on any plant of comparable weight and cost.

Efficient drive is developed

V-belts and a minimum of high-speed steel roller chains drive the entire plant, except for one fully enclosed right-angle drive.

For quick moves, it's seldom necessary to dismantle feeder hopper, feeder, sand conveyor, or power unit. Just pull into a new pit, start the power, and go to work!

The 35-S is designed for long life with a minimum of down-time. On the rare occasions when maintenance is necessary, parts are easy-to-reach and easy-to-repair.

If you're considering a project in which extra portability and low cost production will prove an advantage, it will pay you to investigate this revolutionary new plant. You'll be surprised at its low cost, as well as the competitive advantages it will give you.

For more details, write to Pioneer Engineering Works, Inc., Minneapolis 13, Minnesota (subsidiary of Poor & Company, Chicago).

MOVING WEIGHT AND POWER	
Total weight	55,900 lbs.*
Weight front end	22,800 lbs.*
Weight rear end	33,100 lbs.
Power required	130-150 HP continuous at 900 RPM output shaft speed for on-plant, 900-1200 RPM output shaft speed for off-plant.

*Weight with semi-hitch. For single axle dolly, add 2200 lbs.

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Span over 1,000-foot channel has piers of Prepakt concrete; temporary work bridge had ingenious design and construction

1955. Fred Johnson was general superintendent for Wikstrom, while Ira M. Hogt is resident engineer for Praeger-Kavanaugh, New York City, the consulting engineer for this and two other bridges included in the project.

As soon as the substructures on one side were far enough along, erection of the superstructure started. While the steel superstructure was being erected on the south bank, the north river pier was just being started.

Wikstrom built a stone dike extending 260 feet from the shore into the river to protect the cofferdams for the river piers and to provide access to the piers. More than 20,000 tons of quarry stone in pieces ranging from 10 tons down were dumped into the river to build this dike. At the outer end, where the water is 40 feet deep and the current flows at 20 mph, a steel crib or basket, made of H-beams welded together to form a box-like frame, anchors the end of the dike. After the crib had been set, steel sheathing was driven inside to form a tight box, and this was filled with stone.

The cribs were tied back against the force of the current with four 1-inch steel cables secured to 10-ton concrete anchors. Two of these cribs were taken out by the ice floes before the third one was finally made secure. The top of the dike, brought up to about four feet above the water surface and widened to about 25 feet, provides an access roadway and working platform.

This dike was located approximately 60 feet upstream from the end of the pier, and another dike or working platform was built from the end of the main dike downstream to the pier location. This resulted in an L-shaped dike extending 260 feet from shore and about 60 feet parallel to the shore at the outer end. The 60-foot leg included a 12-foot-square icebreaker at the upstream end of the pier. The icebreaker, a sheet pile cell filled with stone, will be needed only until the Long Sault Dam is completed. After that there will be much less flow in this channel and no appreciable ice problem.

Cofferdam frame on pontoons

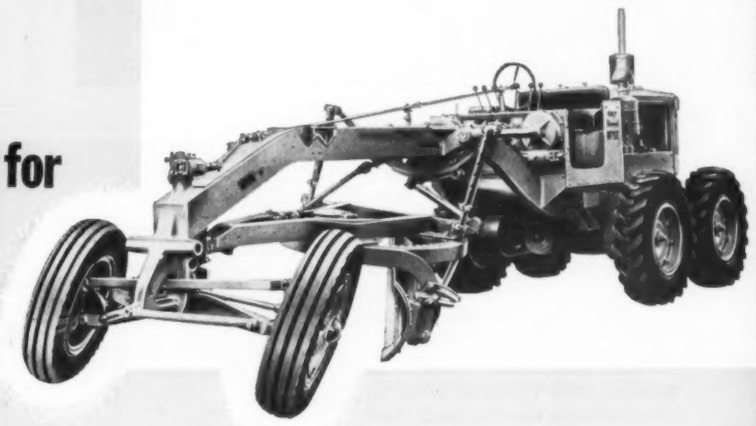
In the relatively quiet water behind the dike, the contractor assembled the cofferdam frame on eight 5×7×7-foot pontoons. End frames were made of 33-inch I-beams, while most of the other members of the frame were 12-inch H-beams. Two 33-inch I-beams, attached to the icebreaker so that they cantilevered out on both sides of the pier site, formed a pocket into which the floating frame was towed.

With these beams holding the frame in position and the pontoons supporting it just above the water surface, the sheet piling was driven around the frame to complete the cofferdam. Working from the dike, a Koehring 1005 crane, assisted by a barge-mounted steam crane, used a McKiernan-Terry 9-B-3 steam hammer to drive the sheeting. Equipped with clamshells, these two cranes then excavated to solid rock inside the cofferdam.

Before the cofferdam was unwatered, a 16-foot-deep tremie seal of concrete was placed. This, and all other concrete in this contract, was placed by the Prepakt method, Curtis Drake supervising work for Intrusion Prepakt, Inc., Cleveland, Ohio, subcontractor on the grouting operation. Coarse aggregate was delivered to the job by Barrett Crushed Stone Co., Norwood, N. Y., and dumped in a stockpile on the dike. Using a Williams 1½-yard clamshell bucket, the Koehring 1005 crane transferred the material to the cofferdam. A 120-foot boom on the crane enabled it to reach the far end of the cofferdam from its position on the dike.

When the coarse aggregate had

Exclusive new oil clutch for CAT* No. 12 Motor Grader can give you



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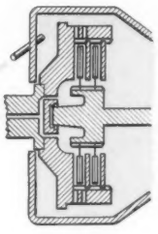
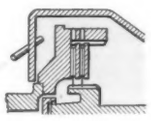


Crankcase oil is directed, under pressure, into clutch compartment through holes in flywheel. It is circulated by centrifugal force and returned to the crankcase by the flywheel ring gear. When the clutch is disengaged, cool oil surrounds the specially bonded cork facings.



As clutch discs move to engaged position, facings are "oil protected." Once engaged, they are completely free of oil.

Cork facings have a network of grooves that enable oil to escape during engagement. Oil constantly lubricates all moving parts.

Extensive tests have shown that clutch facings wear an average of only 2½ *thousandths of an inch per thousand hours of operation* with the new oil clutch for the Caterpillar No. 12 Motor Grader. Here are four good reasons why this new oil clutch can mean lower cost, better performance on *your* job:

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4 JOB PROVED: in exhaustive, on-the-job tests, this exclusive oil clutch in the No. 12 has delivered the same efficient, reliable performance as the thoroughly proved oil clutch on Caterpillar track-type Tractors.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

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99% OF ALL CAT MOTOR GRADERS ARE STILL IN USE

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A Koehring 1005 crane with a Williams 1½-yard clamshell moves aggregate from a stockpile into the pier form. The crane works from a platform built 260 feet out from shore.
C&E Staff Photo

The Hawkins Point floating bridge consists of two trusses, each 350 feet long. Trusses were assembled on shore and floated into position on barges. ►

been placed, mortar was pumped in through pipes to displace the water and complete the concrete mix. Sand, cement, and Alfesil admixture for the mortar were batched from a paving-type batch plant. A Lima Paymaster crane charged the sand bins, and cement was batched from a Blaw-Knox cement plant. Alfesil was added by hand. Batch trucks hauled to the Koehring 34-E Twinbatch paver set up on the bank near the south abutment, and water was pumped from the river directly to the mixer by a pair of Marlow 3-inch pumps. Intrusion-Aid was added by hand at the mixer.

As the mortar was mixed, it was discharged through a chute to a hopper and then through the Prepakt screen and agitator. Three Gardner-Denver air-powered grout pumps took the mortar from the agitator and pumped it through pipes to the pour in the cofferdam.

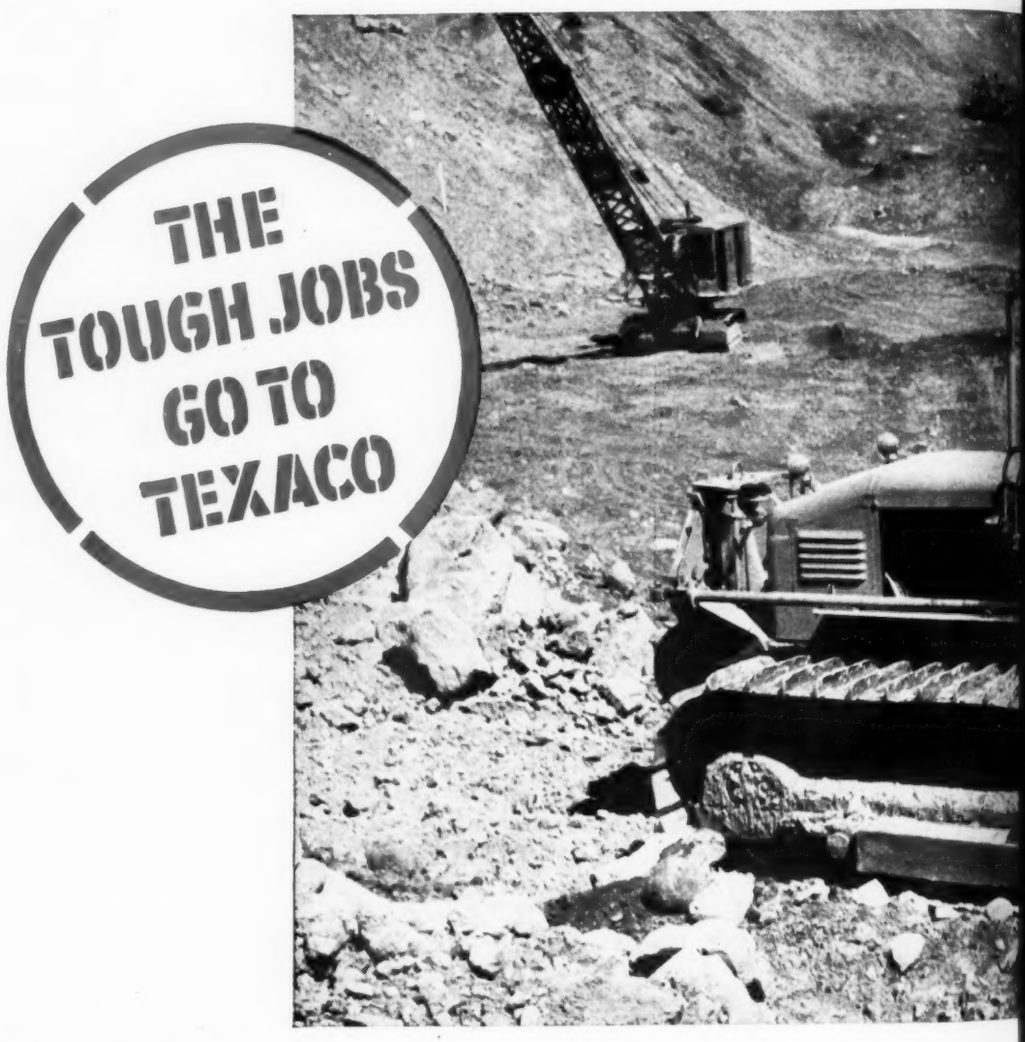
A battery of four pumps unwatered the cofferdam for the succeeding stages after the tremie seal had been placed. Unwatering was done by a Morris 8-inch dredge pump and a Rex 10-inch centrifugal unit mounted on a barge moored beside the cofferdam. Marlow and Gorman-Rupp 6-inch centrifugals, set on a platform inside the cofferdam, kept the cofferdam dry once it had been unwatered.

Once the cofferdam was dry, a second bracing frame was installed about 6 feet below the first one. The two frames were then supported inside the cofferdam on cables attached to the top of the sheathing. Hand-operated winches attached to each of the cables raised and lowered the frames as the work progressed.

Forms were set inside the cofferdam, and the pier was poured in lifts of about five feet by the Prepakt method. An armor of ½-inch wrought-iron plate, 33½ feet high and extending all around the pier, protected the main stem of the pier from ice damage and became the form for this portion of the pier.

When a 5-foot-high section of the armor plate had been placed, the grouting and sounding tubes for the mortar were positioned and the crane clammed in the coarse aggregate. Workmen inside the form spread the aggregate uniformly over the area to prevent segregation. Grout was pumped in to fill the voids when the form had been completely filled.

With the south abutment built and work in progress on the south pier, construction of the north pier and abutment on the island could begin. The temporary floating bridge to the island was completed, and men and equipment could be moved across safely. For the first operations, a Koehring 605 dragline with a fleet of Euclid end-dumps and two Caterpillar D8 tractor-dozers graded the abutment area and built the dike and working platform for the pier. Equipment used on the completed south bank was moved to the island for use



ROUGH AND TOUGH conditions on construction jobs demand full, dependable power from engines. This calls for effective lubrication—and so all Eimco tractors are completely Texaco-lubricated and shipped with a factory fill of *Texaco Ursa Oil Heavy Duty* in their diesel crankcases.

As contractors everywhere know, this Eimco recommendation for its own equipment is equally good for all diesel and heavy duty gasoline engines.

Texaco Ursa Oil Heavy Duty is one of the complete line of famous *Texaco Ursa Oils*—especially refined and processed to make engines deliver more power with less fuel over longer periods between overhauls.

Other Lubrication

Eimco also uses *Texaco Regal Oil R&O* to prevent sludge, rust and foam in hydraulic systems. *Texaco Track Roll Lubricant* to assure long roller life. *Texaco Marfak* to protect chassis bearings against

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TEXACO

TEXACO

A traveler swings floor beams into position for the new permanent bridge. Temporary erection bents are under the bottom truss chords.

on the north abutment and pier.

To get the mortar for the concrete from the plant on the south shore to the pier on the north side, the contractor strung a cable from towers on both sides of the river and suspended a grout line from the cable. Aggregates were trucked across the temporary bridge and placed for the south pier, and grout was pumped across the river through the suspended pipeline.

The superstructure of the bridge, furnished by The Mt. Vernon Bridge Co., Mt Vernon, Ohio, was erected by American Bridge Co., with W. R. Holmes as superintendent. It consists of a double-cantilever truss with spans of 282½, 508½, and 282½ feet. A single-track railroad occupies the center 16 feet of the bridge deck with 11-foot roadways on each side. When the Barnhart Island Power Plant is completed, the railroad will be removed and the entire bridge will be available for motor vehicles.

Temporary floating bridge

With the permanent bridge not scheduled for completion until December, and with work on the Barnhart Island Power Plant initiated this past June, some temporary connection from the mainland to the island was obviously necessary. The swift treacherous current ruled out boat and barge transportation, and a temporary bridge seemed to be the logical solution. A floating bridge proved to be the best temporary structure.

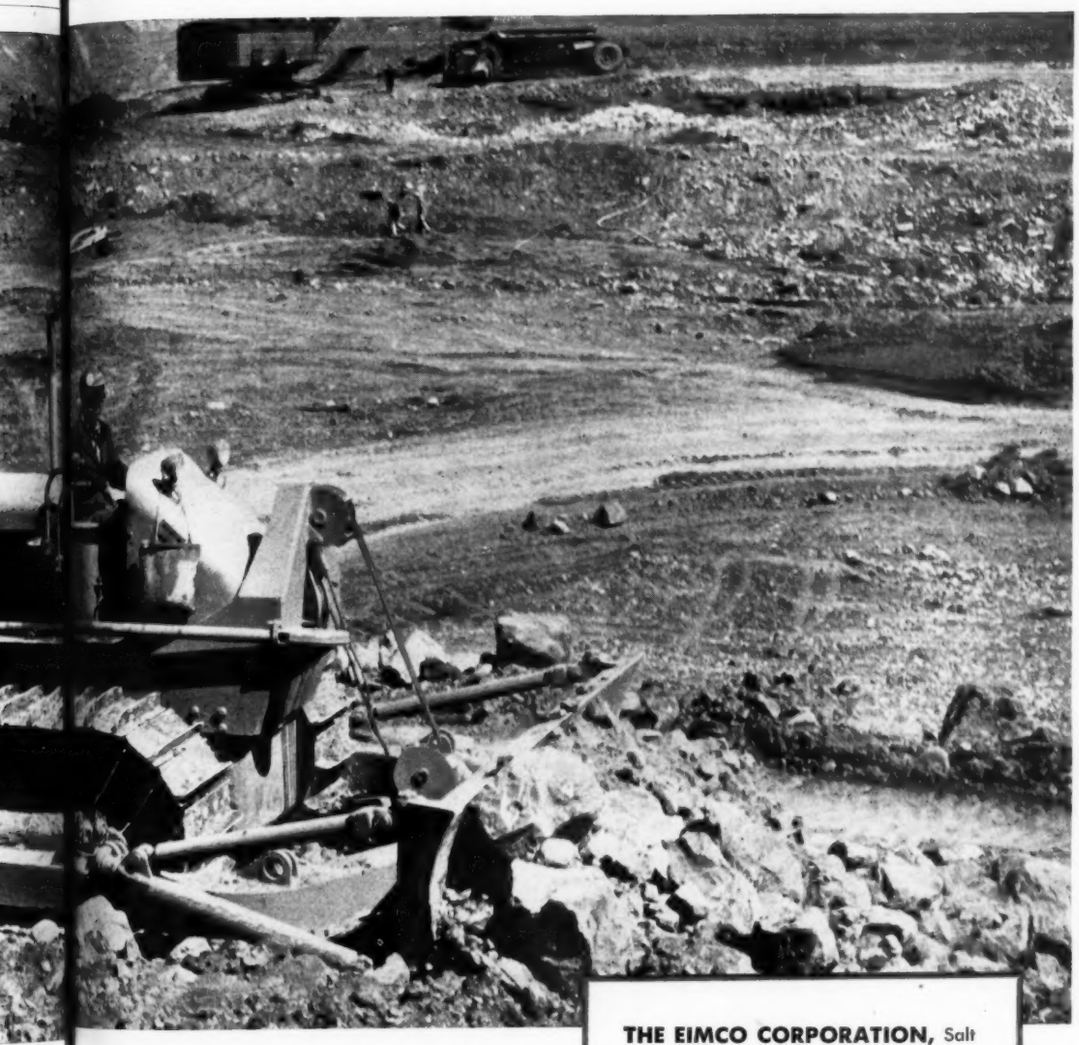
This bridge consists of two 350-foot-long trusses. Two 40×160-foot barges, drawing about 6 feet of water, float each truss. A fifth barge under the center of the bridge will keep the bridge afloat in case one or more of the other barges should sink. An abutment at each end of the structure retains the earth fill of the approaches and makes the bridge safer. Normally the trusses and the superimposed load are carried entirely on the four floats under the trusses, and only in an emergency would either the center float or the abutments carry any load of the bridge itself.

Three 2¾-inch cables fastened into the concrete anchorages at each end hold the floats in place against the swift current of the river. Each of these anchorages contains 900 cubic yards of concrete. The three cables lie side by side in a horizontal catenary between the two anchorages, upstream from the bridge. Suspender cables from the three main cables are attached to each of the five barges to hold the floats in place against the current.

A vertical suspension cable keeps the main cables out of the water. Running between two tall towers on opposite sides of the river, this 2⅛-inch cable supports the main cables at the quarter points. The three main cables are held out of the water at the center barge. The steel towers for the vertical suspension cable are 5 feet square and are 101 and 86 feet high on the south and north sides, respectively.

Trusses assembled on shore

The car floats were towed from New York City to the St. Lawrence River and then to a prepared anchorage just below Hawkins Point. Here the trusses were assembled on shore with their ends supported on bolsters resting on standard railroad car trucks. A channel was dredged out, and the tracks laid on opposite sides



wear and rust. Texaco gear lubricants for transmissions and differentials.

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The Texas Company, 135 East 42nd Street, New York 17, N. Y.

THE EIMCO CORPORATION, Salt Lake City—one of the West's oldest and largest manufacturers of heavy mining and industrial equipment—has been a Texaco user for years. Not only are Texaco lubricants used throughout its manufacturing operations, but all new Eimco Model 105 tractors are delivered factory-filled with Texaco lubricants.

Lubricants and Fuels
FOR ALL CONTRACTORS' EQUIPMENT

For more facts, use Reader-Reply Card opposite page 18 and circle No. 205

Workmen inside the pier form spread the aggregate dumped by the crane. Marlow and Gorman-Rupp 6-inch pumps which assisted in the dewatering are on the platform in the background. *C&E Staff Photo*

of the channel so that the trusses could be run out on the rails until they were directly over the floats. The floats were ballasted with water until they were low enough to go under the trusses. One by one the trusses were pulled into place, and the water was pumped out of the floats until they rose to pick the truss off the bolsters.

Winches on the floats and on shore maneuvered each pair of floats with its truss into position in the river. Handling these unwieldy craft in the swift current of the river was no simple operation, but the bridge was brought into place without serious incident. Within a few days it was temporarily opened to traffic, and a shovel was moved across, proving that the bridge was safe for traffic. The temporary structure will be removed this winter when the permanent bridge is finished.

The temporary floating bridge was designed by Praeger-Kavanaugh, engineering consultants of the Power Authority of New York State. Their representative on the job was Ira M. Hoyt, resident engineer. The span was built by Walsh Construction Co., New York, N. Y., with Pat Dillon supervising the work. THE END

Flexible pipe couplings

■ Universal Sewer Pipe Corp. offers an illustrated brochure containing descriptive information and installation data on Universal vitrified clay pipe with pre-assembled Tylox flexible couplings.

Of special interest to engineers, contractors, municipal officials, and others concerned with planning and building sewerage and drainage systems, the brochure gives information on Universal's rubber, Neoprene, and Polyvinyl chloride-resin types of Tylox couplings, and recommends where each type should be used.

To obtain this literature write to Universal Sewer Pipe Corp., 1500 Union Commerce Bldg., Cleveland 14, Ohio, or use the Request Card at page 18. Circle No. 25.

THIS ALL-ALUMINUM welded flat-bed truck trailer, manufactured by Beall Pipe & Tank Corp., is capable of a 50,000-pound payload despite its light weight (7,986 pounds). Fabricated of a Kaiser high-magnesium-type aluminum alloy, the unit has proved its structural strength in more than eight months of grueling field tests—hauling heavy steel pipe over mountainous highways. The 35-foot-long trailer is mounted on 7.50 × 22 forged-aluminum disk wheels with 10:50 × 22 tires. For further information write to Beall Pipe & Tank Corp., 12005 N. Burgard St., Portland 3, Oreg., or use the Request Card at page 18. Circle No. 25.

Griffin pumps used to install "Texa[s] To[wer]"

Six heavy-duty, large-volume pressure pumps performed dependably in caisson jetting for first ocean radar platform. Caisson legs were sunk 45 ft. below ocean bottom by the contractors—Raymond Concrete Pile Co. and DeLong Corp., a joint venture.

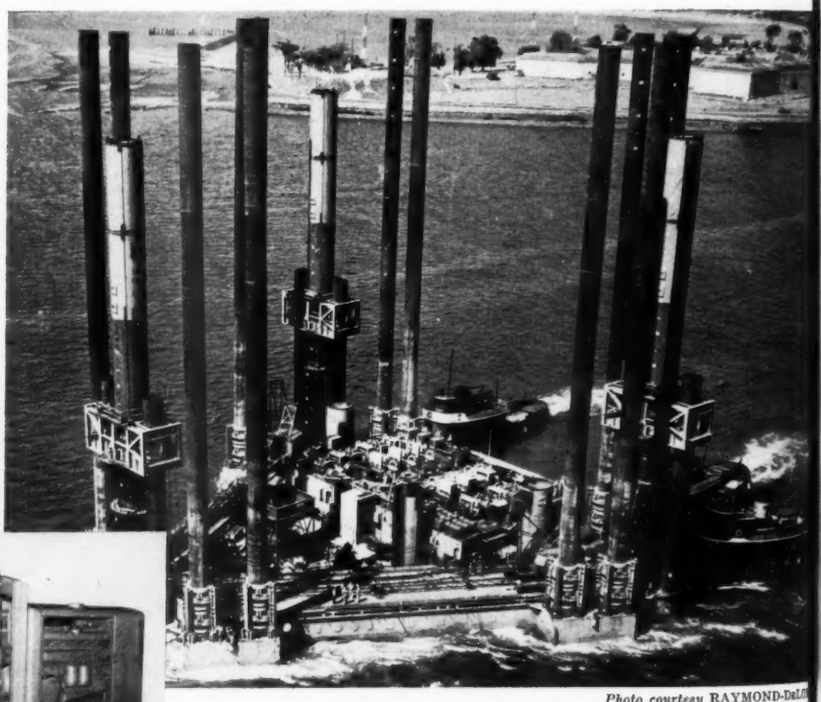
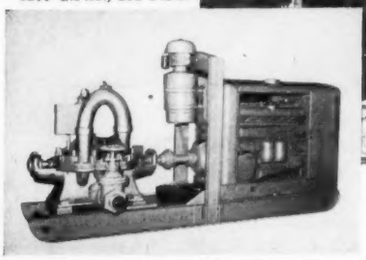


Photo courtesy RAYMOND-DeLO[NG]

Photo shows pumps mounted on radar station as the 6,000-ton steel struc[ture] is towed down Boston Harbor to Georges Banks, east of Cape Cod. Here, 3 legs were dropped 56 ft. to the ocean floor and then sunk 45 ft. dee[per]. Air jacks raised the platform 81 ft. above water level.

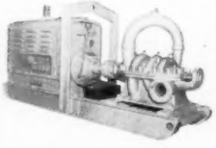
1200 G.P.M., 251 P.S.I.



GRIFFIN'S MODEL 275, used for "Texas Tower" jetting. Like all Griffin pumps, it is available for rental as well as purchase. We maintain large pump stocks. Hence, promptness of shipment is a feature of Griffin service.

OTHER GRIFFIN JETTING PUMPS AVAILABLE FOR RENTAL OR PURCHA[SE]

1400 G.P.M., 303 P.S.I.



650 G.P.M., 260 P.S.I.

650 G.P.M., 205 P.S.I.

400 G.P.M., 175 P.S.I.

The new International S-120 four-wheel-drive pickup truck, powered by a Black Diamond 131-hp 240 engine, is available in four wheelbase sizes and five body sizes.

New International truck line combines power and durability with comfort and style

■ Increased power and durability have been combined with new style and operator-comfort features in its new line of trucks, according to the Motor Truck Division of International Harvester Co. The new S line includes four and six-wheel gasoline and LGP-powered models ranging in gvw from 4,200 to 33,000 pounds.

Although light and medium-duty trucks are spotlighted as never before in this new line, important emphasis has also been given to heavy-duty models comprising the S-180 series. In this latter category, Roadliner truck-tractors, Loadstar four and six-wheel dump-truck chassis, and several cab-forward models are featured.

A wide range of pickup, panel, added-capacity and other conventional models are also offered in the light-to-medium weight class. In many instances, the new models have larger engines and a number of new functional features as standard equipment, which were formerly offered as optional equipment.

The S-line models have Comfo-Vision all-steel cabs which feature all-around vision, controlled ventilation, and minimum-effort steering, shifting, and braking controls. Driver comfort has been emphasized in the placement of the operator's seat and the angle of the steering wheel and toe boards. An optional deluxe cab, available on all conventional four-wheel models up to and including the S-170 series, provides special insulation and interior design features.

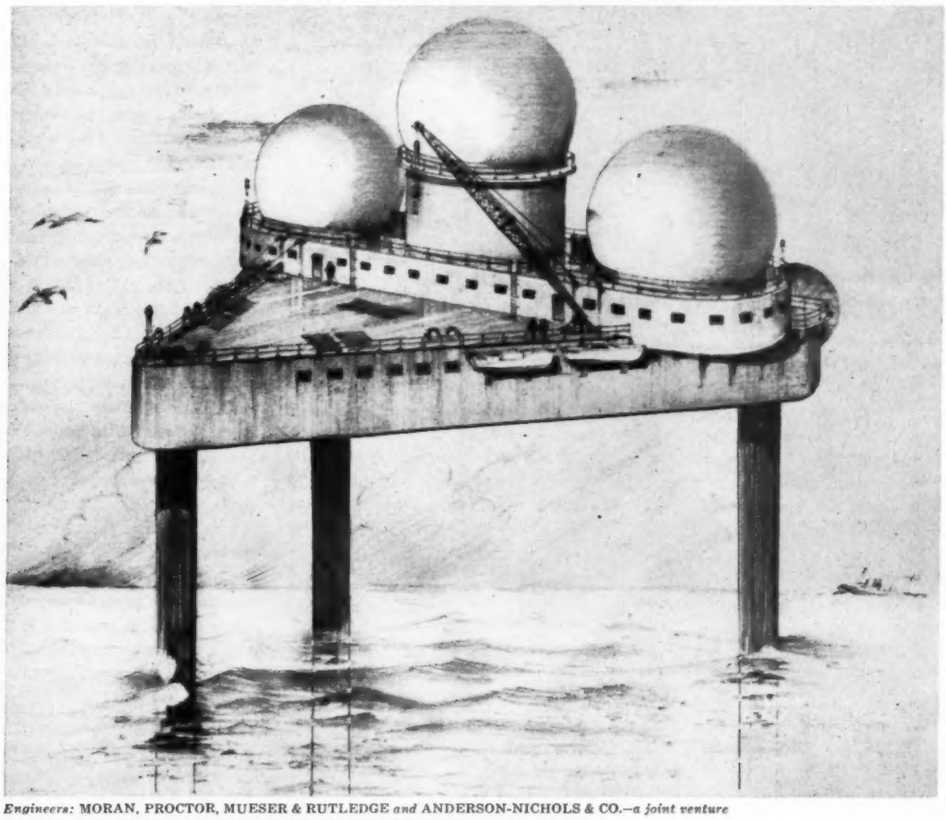
The complete S line of models is offered in a variety of two-tone color combinations.

This new line of trucks is designed to augment International's R line of heavy-duty trucks, the series of four and six-wheel cab-over-engine models, and the 400 series for heavy-duty mountainous hauling.

For further information write to International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill., or use the Request Card at page 18. Circle No. 49.

exa"ower" in complex jetting operation

Drawing courtesy MORAN, PROCTOR, MUESER & RUTLEDGE *and* ANDERSON-NICHOLS



Engineers: MORAN, PROCTOR, MUESER & RUTLEDGE *and* ANDERSON-NICHOLS & CO.—*a joint venture*
Contractors: RAYMOND CONCRETE PILE CO.-DELONG CORP.—*a joint venture*

On a problem so unique—with so many unpredictables—efficient, dependable equipment was a "must." So we are naturally gratified that the contractors selected Griffin jetting pumps—based upon their previous experience.

Six of our Model 275—large-volume, high-pressure, heavy-duty pumps—were shipped on short notice. These made available a combined capacity of 6,300 G.P.M., at 700 ft. T.D.H.

Water was furnished by 3 vertical turbine pumps, with total capacity of 6,900 G.P.M., at 165 ft. T.D.H.

All pumps were powered by G.M. Diesel Engines. Jetting was handled with a single jet more than 200 ft. long, equipped with multiple nozzles at the tip.

When *you* meet jetting problems, put Griffin pumps to work. They'll give you sure economical performance under any conditions, from the most routine to the most rugged. Catalogue sent on request.

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For more facts, use Reader-Reply Card opposite page 18 and circle No. 206

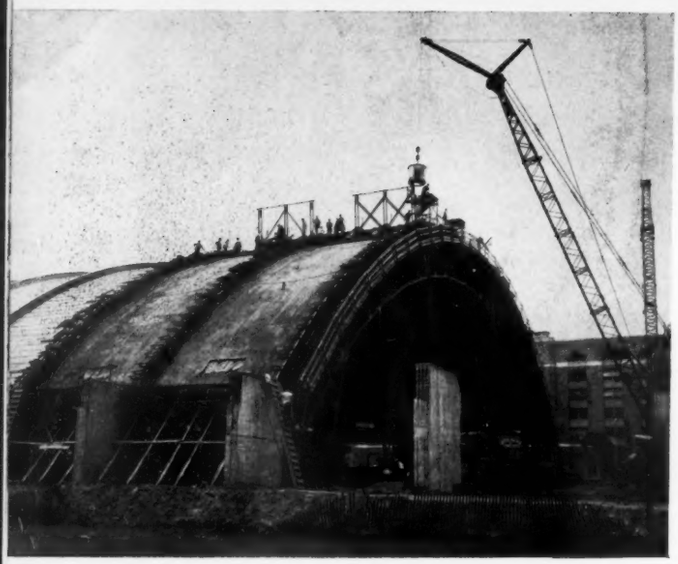
Electric metal shears

■ Powered by a universal-type motor, the new Mall electric metal shears has a cutting capacity of up to 16-gage steel. The tool has a stroke length of 3/32 inch with 2,500 strokes per minute. It is designed with ample clearance to cut up to 0.06-inch thickness. Although the minimum radius

of circle cut is one inch, smaller diameters can be cut in softer and thinner materials by cutting counter-clockwise.

Enclosed in a sturdy, lightweight, die-cast aluminum housing, the metal shears has a switch operated by squeezing the tool and depressing the paddle. This provides one-hand operation, allowing the operator to hold and guide his material with his free hand.

For further information write to Mall Tool Co., 7725 S. Chicago Ave., Chicago 19, Ill., or use the Request Card at page 18. Circle No. 198.

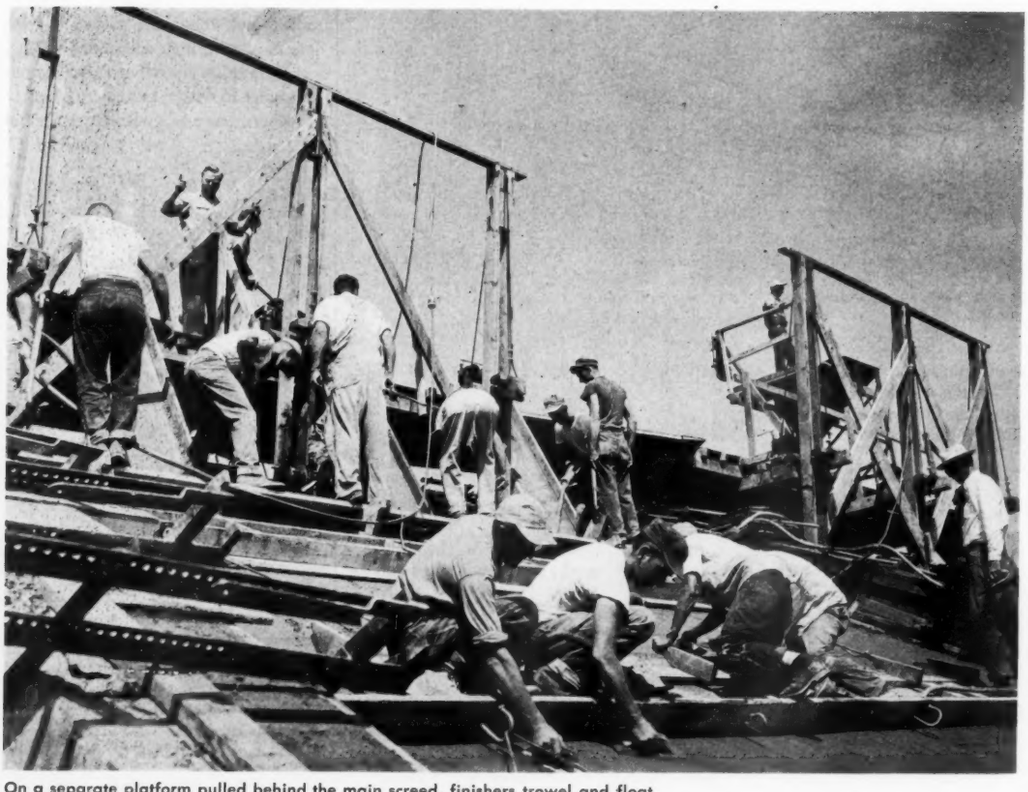


The sides of beam forms are tied together with Concrete Forms Co. clamps while a pour is completed with concrete supplied by Castle & Doyle, Inc., Madison, Wis., in Rex Moto-Mixers. Heavy buttresses absorb loading from the arch ribs.
C&E Staff Photos

Thin-shell concrete roof built on steel falsework

Self-leveling platforms ride tracks to the top of the roof as concrete placing and finishing crews complete 3-inch shell

by RALPH MONSON, field editor



On a separate platform pulled behind the main screed, finishers trowel and float the concrete surface to remove imperfections. Frank Miller, manager for J. L. Simmons, signals for the platform to be raised higher.

A steel-arch falsework system, consisting basically of three continuous 8-foot-deep welded arch trusses, provided one of the more unusual features of construction on the Camp Randall Memorial building, a thin-shell barrel-arch structure enclosing a 200-foot-wide and 400-foot-long indoor practice field at the University of Wisconsin.

Brought to completion by J. L. Simmons Co., Inc., Chicago, Ill., under a general contract for just short of a million dollars, the project also includes separate contracts for heating, plumbing, electrical work, and equipment which are expected to bring the cost of the completed facility to about $1.5 million. Designed by Ammann & Whitney, New York, N. Y., consulting engineer, and Fitzhugh Scott-Fitzhugh Scott, Jr., architect, Milwaukee, Wis., the building has a sand and clay floor suitable for baseball, football, and track. Floors can be installed so that basketball, and other indoor sports can be played in the building.

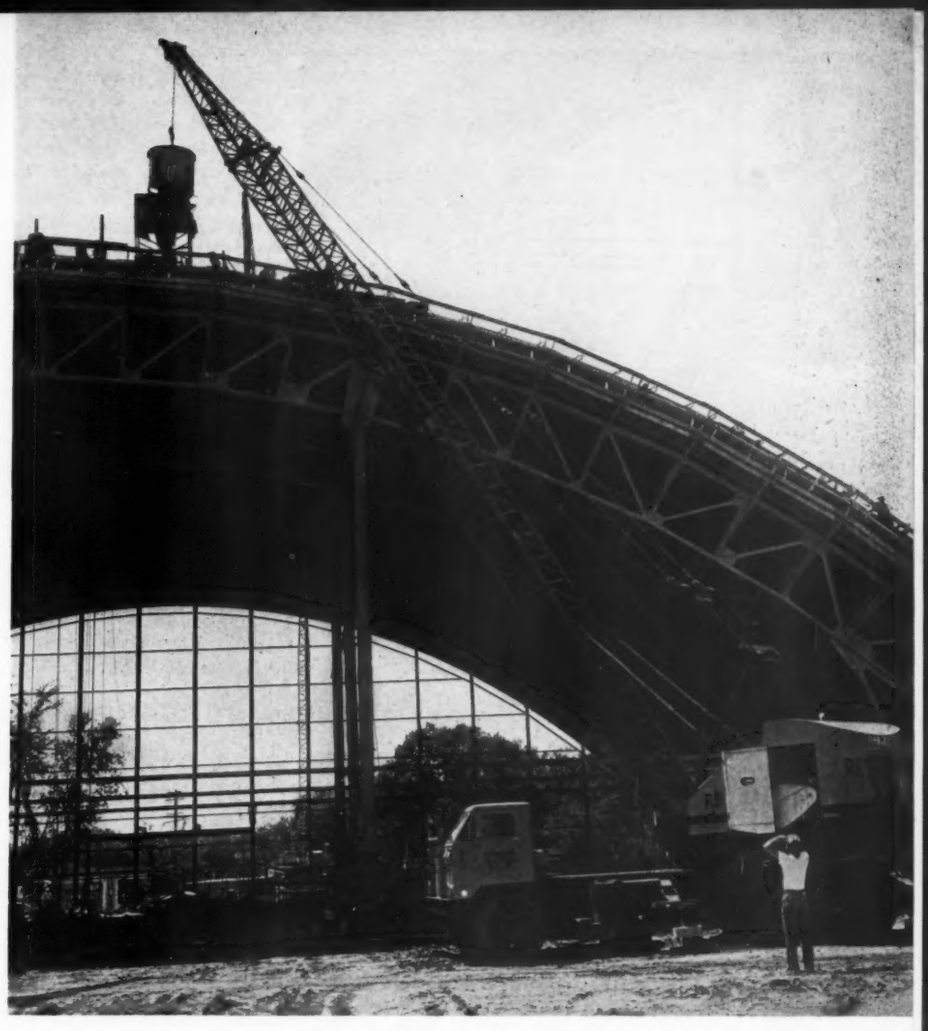
The structure's reinforced-concrete arch ribs and the thin concrete roof shell between them span the 200-foot width of the building without interior supports. The roof is 15 feet above the dirt floor at the sides and 68 feet high at the center. The 15 ribs are spaced 28 feet 8 inches center to center. Two bays consisting of one full rib in the center and half ribs at the ends, connected by the 3-inch roof shell, were poured as a unit. Seven of these 57-foot 4-inch-wide pours completed the roof.

Steel-arch falsework system

The steel-arch falsework system was designed and fabricated by Blaw-Knox Co., Pittsburgh, Pa. This centering used three continuous 8-foot-deep welded arch trusses, one to support each of the three heavily reinforced concrete ribs. The heels of the arch trusses were supported on each side by a pair of 15-inch channels spaced 3 feet apart and laced together. Each pair of channels in turn was supported by six Buda 75-ton worm-gear jacks, two jacks under each heel point. Each arch truss was further supported by two steel columns located at the third points of the span. Each of these columns was supported on two Buda 50-ton jacks.

Serving as a foundation support were 12 heavy timber cribs, placed on the subgrade at all of the steel column and steel-arch heel locations. The load on these cribs varied from 100,000 to 240,000 pounds, and required from 70 to 160 square feet of bearing area. Soil bearing values available in parts of the area were less than 1,500 pounds per square foot.

Unlike those in ordinary tied-arch-bridge centering designs, the intermediate columns in this case were



One of two cranes bringing concrete to transfer hoppers on the form is this Insley WB Lorry crane. The 32-ton-capacity rig handles the Gar-Bro bucket with its 100-foot boom and 20-foot jib.

considered necessary. They assured proper support and accurate control of elevations established as ¼ inch plus or minus at all levels of the arch and also guaranteed that a previously established sequence of form stripping would be followed.

When the falsework was being moved, the intermediate columns were not required to support the load of the formwork, and for economic reasons the falsework was converted to a tied arch. This eliminated the additional tracks which otherwise would have been required for the central columns.

With the form in the pouring position, the central columns were supported by jacks, thus converting each of the steel arches into three simple spans. The cross ties on the centering were loosened so that the load was carried by the six center columns and the six outside points of support. After the concrete had hardened and the centering had been lowered to a point where the arch concrete carried its own weight, the falsework was converted to a tied arch supported on railroad trucks at the heels. The central columns were suspended from the arch.

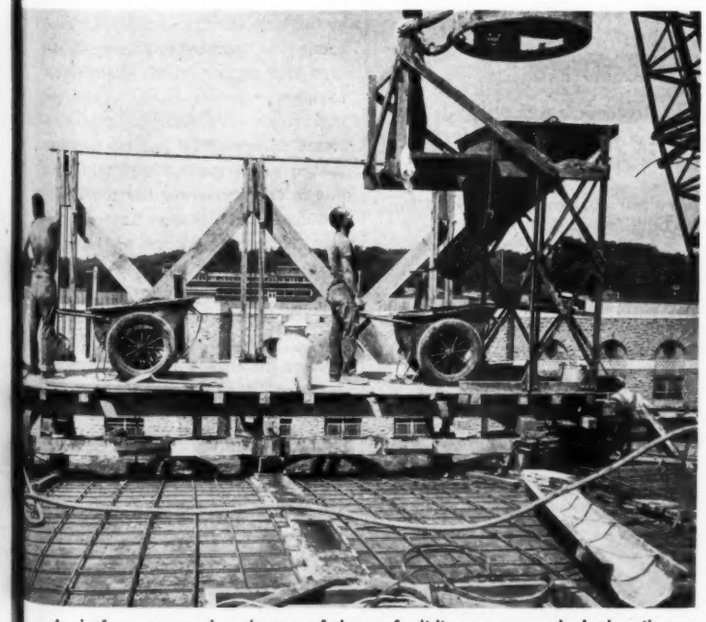
In order to create the arch action in a completed roof section, it was necessary to throw the concrete into compression when decentering. This was done by a carefully controlled lowering of the worm-gear jacks in predetermined amounts at each of the central supports until the jacks began to unload. As this happened, both the crown curve of the concrete arch and the steel falsework flattened together, and the concrete arch was thrown into compression.

The arch deflection at decentering was due almost entirely to rib shortening, the dead load moments being quite small. The resulting deflections, all downward, ranged from zero at the buttresses to a maximum of almost 2 inches at the crown. Without the central steel columns, other means of control would have been required to place the concrete arch in sequential compression.

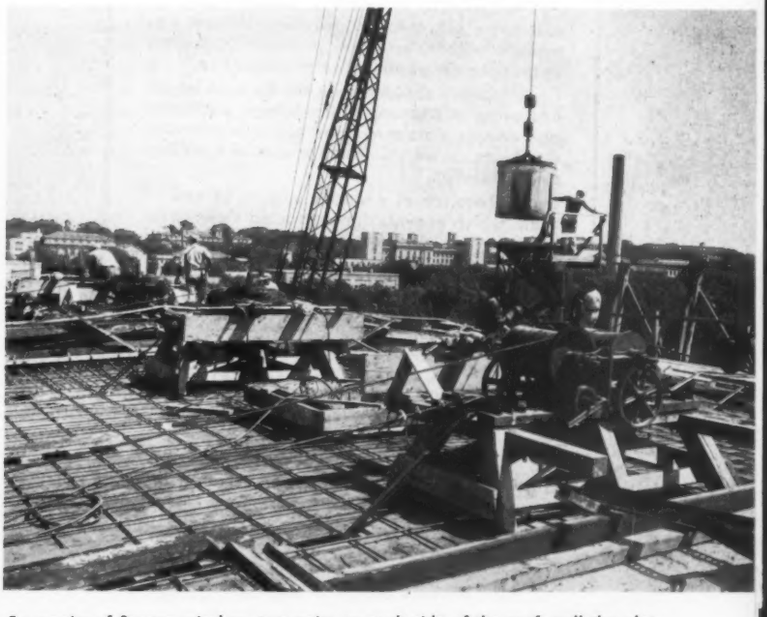
Form needs much lumber

The huge form which carried the concrete and transmitted the load to the steel falsework required a carload of plywood and two carloads of dimension lumber. The basic supports of the form were 2×12 timbers cut to the contour of the modified catenary curve of the concrete-arch soffit. These timbers were bolted directly to the steel channel stringers of the falsework. Soffits for the arch ribs consisted of ¾-inch plywood laid directly on the curved timbers. Arch ribs project 11½ inches below the underside of the roof deck in this design.

Spanning between the timbers in the longitudinal direction of the building were 2×12 joists at 2-foot centers with solid bridging between. Decking over these joists was ¾-inch



A platform approaches the top of the roof, sliding on greased plank rails supported on short pieces of plank which hold the track off the reinforcing. As the pour nears the top, rubber-tire buggies dump to chutes from the outer edge of the platform.



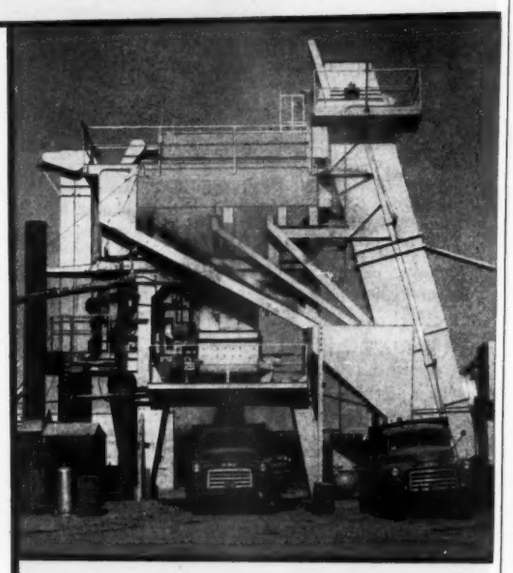
Four pairs of Sasgen winches—two pairs on each side of the roof—pull the platforms up the curve of the arch. The winches are mounted in pairs so that they pull against each other. A common switch operates motor for the pair of winches on each platform.

◄ With a pour complete, the falsework is converted to a tied arch, the central columns suspended from the arch while it rides to a new position on railroad trucks. Two Sasgen winches move the form.

MADSEN *Equipment that Serves.*

PACKED WITH MORE THAN 25 OUTSTANDING FEATURES

The MADSEN 481 Portable ASPHALT PLANT



Here is an asphalt plant that is in a class by itself when it comes to profitable operation. Compare this plant feature-by-feature with any other in the field, and you will quickly see why the MADSEN 481 is the talk of the industry.

All air-operation of bin gates, asphalt pressure injection and mixer gate reduces operator fatigue thereby increasing daily tonnage. Air-operation is faster, more accurate and decreases time cycle from bin to truck.

Finger-tip action of weighing and mixing controls, centrally located for maximum convenience and efficiency.

New MADSEN Model 440 Twin-Shaft Pug Mill Mixer (Patented). Has improved mixing action, faster discharge, built-in oversize capacity and precision-edge ground, externally removable sectional liners.

In-built duct work to relieve pressure on mixer weigh-box housings, bin, hot elevator and screen housings to draw-off vapors, moisture and dust.

Exclusive bin design (Patent Pending) eliminates segregation, provides uniform aggregate withdrawal, and promotes improved aggregate distribution in the weigh-box.

Safety equipment in the form of larger operating platforms, maintenance platforms and complete stairway and caged ladderway structures . . . all unit-built for ease of handling and assembly.

Location of operator station on end of plant which provides unobstructed view of incoming and out-going trucks . . . away from fumes and heat.

In-built reserve capacity. MADSEN has pre-designed into the Model 481 the opportunity to later increase the batch size to 5000-lb. or 6000-lb. efficiently and economically.

● MADSEN-DESIGNED AND MADSEN-BUILT THROUGHOUT!

Unit construction designed for easy stacking in factory-matched unit sections, factory-fitted for quick field erection.

A MADSEN PLUS!

. . . an advantage you get only in MADSEN Asphalt Plants.

MADSEN's more than 40 years experience in designing and building asphalt plants . . . a thorough knowledge of the in-the-field problems encountered on every bituminous mixing job, and a practical approach and solution to these problems . . . combine to help give you those plus advantages that **increase production, reduce maintenance costs,** and **save countless dollars in plant operation.**

If you are considering the purchase of an asphalt plant, it will pay you to get the complete story on the MADSEN Model 481. See your MADSEN Distributor today.

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BLH CONSTRUCTION EQUIPMENT DIVISION

For more facts, use Reader-Reply Card opposite page 18 and circle No. 207

plywood. The portion of the rib projecting above the deck was formed with ¾-inch plywood backed by 2×4 plates laid flatwise and tied with Concrete Forms Corp. steel beam clamps. These quick-locking beam clamps, which could be placed over the top of the beam quickly, provided a secure and accurate method of holding the beam sides together. Precast-concrete blocks were placed on the deck form to support the rib forms and these 3-inch blocks provided for the junction of the ribs and the roof shell.

In this design, the arch ribs taper from a depth of 46 inches at the spring line to 30 inches at the crown. With 11½ inches of the rib projecting below the 3-inch roof shell, the exposed remainder tapered from 31½ inches at the spring line to 15½ inches at the crown.

Pouring, finishing platforms

The job of placing concrete up the roof slopes from the spring line to the top of the arch was simplified by special self-leveling traveling platforms that carried pouring crews and finishers. Four of the 10×26-foot platforms were constructed, one for each bay of the form on each side of the roof. The platforms in the bays at the leading edge of the form each carried a 1-cubic-yard radial-gate-type floor hopper, which was elevated to allow concrete to be discharged into rubber-tire buggies. The platforms were built up to such a height that a plank runway was laid from one to the other over the top of the center rib beam so that buggies could cross from one platform to the other to distribute the concrete over the entire 57 feet 4 inches of the pour.

The platforms slid on tracks consisting of 4-foot sections of 2×10's, greased to reduce friction with the runners. Short pieces of 2×6's attached to the under side of the tracks fit between the reinforcing bars and held the tracks 2 inches above the form. Three pairs of oak block runners attached to the subframe of each platform rode the three tracks up the roof.

At the upper end, the platform was hinged to the subframe. The lower side was supported by three cables running over sheaves at the top of a vertical frame which was attached to

Workmen tighten up the two Buda 50-jacks and build up the timber crib for center column. The jacks, welded to column for convenience when moving falsework, adjust the column to exact ...ht for pours and lower it when de-...ring is done.

the lower end of the subframe. The cables were anchored to the end of the platform stringers, then run up over the sheaves and down to Sasgen worm-drive winches mounted near the edge of the platform. At the beginning of the pour where the roof pitch was very steep, the outer edge of the platform had to be raised practically to the top of the vertical frame. As the platform advanced up the roof and the pitch became flatter, the outer edge was lowered by winches being hand operated to keep the platform level.

These pouring platforms were pulled up the roof by four pairs of Sasgen 10-ton winches powered by Ka-Mo drill motors. The winches were mounted in pairs at the crown of the arch, one of each pair pulling from each side of the roof. Thus the pull on opposite platforms was balanced, and only the inequality in these pulls had to be absorbed in the winch mounting. Setting up the winches in pairs also made it possible to connect the driving motors with a rigid pipe connection to absorb the torque of the motor.

Each of the four platforms was handled by two winches, one connected to each side of the platform. In order to keep a platform balanced as it rose to the roof, a common switch was used to operate motors for the pair of winches on each platform. The motors could also be operated independently, if necessary, to straighten the platform.

Connected to each platform by two cables was a 4-foot-wide screed extending the full width of the span between the ribs. This served as a strike-off to maintain a 3-inch thickness in the concrete deck and as a platform for workmen placing the concrete. Behind the screed was another platform, also suspended by cables, which was used by cement finishers.

Hoist concrete to roof

Ready-mix concrete was delivered to the site by Castle & Doyle, Inc., Madison, in Rex 5 and 6-yard Moto-Mixers. Two cranes, one on each side of the arch, hoisted concrete to hoppers on the pouring platforms in Gar-Bro 1-yard low-slung concrete buckets. One of the cranes was an Insley WB Lorry crane, rated at 32 tons capacity, with a 100-foot boom. The other was a Northwest 35-ton crawler crane with 100-foot boom and 20-foot jib.

Concrete was discharged from the hopper on the pouring platform to rubber-tire buggies which dumped into chutes leading to the front edge of the screed. On the steep slope of the lower roof, steel chutes were run under the platform, and the concrete was dumped into the chutes at the inside edge of the platform. When work neared the crown, where the roof flattened, the steel chutes were removed and the remainder of the pour was made to wood chutes from the outer edge of the platform.

As pouring proceeded, the rib forms were filled, vibrated, and finished first, and then the deck concrete was placed. As the ribs were finished, short sections of plywood were nailed on to provide a top form and keep the concrete from sloughing downhill.

Workmen with hand shovels rode a platform on the screed, spreading the concrete uniformly over the deck. Other workmen with Maginniss Hi-Lectric vibrators worked the stiff mix down into the reinforcing and compacted it under the screed. The finishers floated and troweled the surface to remove imperfections left by the screed.

As the pouring equipment neared the crown of the arch, the platforms were dismantled and lowered to the ground by the cranes. Then, when the form had been moved ahead to a new pouring position, the platforms and auxiliary equipment were reassembled on the deck.

Two Maginniss generators located on the ground beneath the form provided current for the four vibrators in use on the deck. A third generator stood by for use in case of emergency. Here the generators were out of the way, and the long extension cords did not appear to reduce the efficiency of the vibrators at all.

Placing the 240 cubic yards of concrete in the first roof pour took about 18 hours. As the crew gained experience with its equipment, this time was reduced to about 11 hours. All pours were started early on days when the weatherman forecast no possibility

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THE NEW D9, D8 AND D7 —EXAMPLES OF CATERPILLAR LEADERSHIP IN ACTION

For more facts, use Reader-Reply Card opposite page 18 and circle No. 208

The pouring platforms approach each other as a pour nears completion. The Insley WB Lorry 32-ton truck-crane, right, and the Northwest carry concrete to hoppers on the platforms with Gar-Bro 1-yard buckets.

C&E Staff Photo

A Koehring 304 truck-crane sets one of the roof beams for the entrance. Steel framework for the end of the 200 × 400-foot structure is erected after the first part of the concrete arch roof has been cast.

C&E Staff Photo

of rain. On several pours, this meant waiting 2½ weeks or more for suitable weather.

Decentering and moving form

Concrete for the arch was a 6½-bag mix designed to exceed 3,750 psi at 28 days. The slump was maintained from 2½ to 3½ inches. The compressive strength was required to exceed 2,500 psi with a modulus of elasticity of 2 million before decentering. This was normally attained in about 5 days.

When the form was ready to be moved, the jacks on the central columns were lowered about 2 inches, then the entire form was lowered 20 inches to the moving position. In this position, the crossties were tightened. and the falsework was converted to a tied arch with the central columns hanging free during the move.

Following decentering, two of the Sasgen winches used to pull the concreting platforms during the pour were reset on the ground and used to move the forms forward on two sets of tracks. A 3-foot-wide steel-framed catwalk, suspended below the trailing edge of the centering, provided a working platform for cement finishers patching irregularities on the bottom side of the arch as the centering was moved forward in stages of about five feet. The average time required to decenter the falsework, move it forward, and reset the timber cribbing, jacks, and wedges was approximately 12 hours.

On the day after the arch was poured, 2 × 4 nailing strips were applied to the concrete as a base for the insulation and built-up roof.

Job done in a year

Initial work on the building started with tree removal and grading late in October, 1954. Site grading, including a cut of 6 feet at one end of the structure and a fill of equal size at the opposite end, required 25,000 cubic yards of excavation. Northwestern Construction Co., Inc., Middleton, Wis., did the job, using Caterpillar D7 tractors and Cat 70 scrapers.

Continuous footing trenches, excavated along each side of the site by a Northwest 25 pull shovel, were 25 feet wide and extended to 11 feet below finished grade. After a 2-inch pad of lean concrete was poured in

A PICTURE REPORT OF

INTERNATIONAL POWER *in action!*

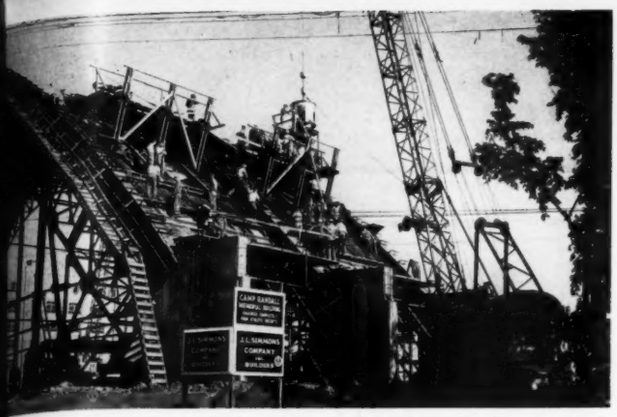
Boosting job production everywhere

13 TD-24's for Nello Teer—Most of the tractor work on their 4.98-mile, 3,065,000-yd. $4,306,000 section of the Massachusetts Turnpike is being done by these 161 dhp crawlers. Four with scrapers combine to average 327 twenty-yard loads daily on 1500 ft one-way hauls. Others tow rippers, push-load scrapers, or clean up around Teer's two 2½ and 4-yd shovels and 10 haulers.

"1/3 more overburden daily than competitive crawlers" . . . that's the report from Merkli Brothers Coal Company, Beaver, West Virginia, on their International TD-24. Unit is stripping 40 feet of sandstone and shale to uncover a 12 to 51-inch coal seam. "It has better balance and visibility than other tractors," says Partner Henry L. Merkli. "It costs less to maintain; takes less time to grease, too."

Crushes gypsum—Near Avena Calif., Superior Gypsum Company International-powered crusher pr duces 300 tons of gypsum per 8-hr. da Material is used to neutralize hig alkali irrigation water.

1 more trip hourly—Fast loading a acceleration help 18½-yd. Payscrap make one more trip hourly than oth self-propelled scrapers used by W. O'Neill Construction Company, Gar on their 2½-mile, 700,000-ya Indiana Turnpike section near Gar Cycle length averages 2½ miles; m terial is mostly sand.



As platforms are winched up the arch, a crawler crane dumps concrete from a 1-yard Gar-Bro bucket into a transfer hopper. A plank runway between the platforms is used by concrete buggies.

the bottom of the trench to keep the reinforcing steel out of the ground, the continuous footing pads were formed and cast.

Footings consist of 3×7-foot and 3×3-foot sections that run the length of the building, spaced 15½ feet apart. They were formed with Symons 2×8-foot form panels tied with Symons form hardware. Buttress footings 25.5×9.5×2 feet were built on the footing pads, and the 2×17-foot buttress sections were then carried 14 feet above grade to the spring line of the arch roof. A total of 3,500 cubic yards of concrete and 250 tons of reinforcing steel went into the footings and buttresses. The roof required about 1,700 cubic yards of concrete and 210 tons of steel.

The ends of the building are enclosed with a steel curtain wall framing having a specially formed pattern of aluminum siding on the exterior. The interior surfaces of the end walls are built of aluminum perforated acoustical panels with 1½ inches of Fiberglas insulation backing. The framed reinforced-concrete bays along each side of the building are faced with random ashlar masonry to match the exterior of the nearby football stadium.

Personnel

General supervision of the project was handled by Frank Miller, manager of J. L. Simmons Co., Inc. Job superintendent was Roy Chambers. Representing the architects and engineers was Robert Hiland. THE END

Prestressed design is covered in new book

All phases of prestressed concrete construction are included in "Design of Prestressed Concrete Structures" which John Wiley & Sons, Inc., has published.

Beginning with the materials and procedures of prestressing, the volume continues through loss of prestress, design for flexure, shear, bond, composite sections, continuous spans, prestressed columns, and tanks. A discussion of economics, fire and corrosion resistance, and impact and fatigue strength concludes the book. Individual chapters deal with such subjects as beam deflections and layouts, continuous beams, slabs, tension and compression members, circular prestressing, allowable stresses and load factors, and special problems.

Written by T. Y. Lin, professor of civil engineering at the University of California, the book is priced at $11.50 and is available from the publisher, 440 Fourth Ave., New York 16, N. Y.

Increased work forecast on nuclear power plants

Much of the $4 billion to $30 billion dollars the U. S. will spend on power plants in the next 15 to 20 years may go into nuclear plants, since by that time the cost of producing electricity with nuclear energy is expected to be low enough to place the system in competition with plants using coal, oil, or falling water as a source of energy.

This is the prediction offered by James A. Lane of the Oak Rridge National Laboratory at Oak Ridge, Tenn., in a paper prepared for the United Nations Conference on Peaceful Uses of Atomic Energy at Geneva, Switzerland. Putting nuclear power on a competitive basis with more conventional plants is the objective of the current U. S. reactor development program now being carried out in the AEC laboratories.

The USAEC program is contemplating the use of five types of nuclear reactors, which will run up varying costs depending on the amounts of material used by each. These include a pressurized water reactor, a boiling water reactor, a sodium graphite reactor, a fast breeder reactor, and an aqueous homogeneous reactor.

←For more facts, circle No. 209

ditch in 3 hours—Excavating ter main in Henderson, Texas, tional "300" wheel tractor dug yds of clay hourly. Backfilling dled by rig's front-end loader. n 4 ft deep, 22 in. wide.

"We saved 100 man-hours by lifting zonolite roofing slabs with our International-Drott TD-6," reports M. G. Aldrich, Macon, Georgia, on the 13,000 sq ft building job shown. Lifts of 1 ton were made to 10 ft eave height.

Rugged in rugged rock—"TD-6 is ideal for opening underground mines," says Malcolm McDonald of Kiabob Uranium Corp, Green River, Utah, "It gets around fast in narrow tunnels, yet brings out big loads."

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A machine size for every job . . . see your nearest INTERNATIONAL DISTRIBUTOR for details
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The $60 million Wheelus Field project near Tripoli, Libya, nears completion on the Mediterranean. Approximately half the equipment and material for this base had to be shipped to the site from the States.

U. S. Army Corps of Engineers Photos

MANAGEMENT

Procurement is half the jo

An urgent message from Wheelus Field in Tripoli, Libya, to the New York office of Crow-Steers-Shepherd, the joint-venture firm on this $60 million U. S. overseas project, told of seven men who had nearly been suffocated by poisonous fumes from a rust preventive they had been spraying on the inside of a fuel tank.

In New York City, the purchasing agent and chief expediter, knowing the poison could be fatal in 18 hours, called the chemical company which manufactured the rust preventive to determine the poisonous ingredient and the antidote for it. The antidote proved to be a substance not readily available at Wheelus Field and, after a hectic search, a quantity of it was finally located in a St. Louis, Mo., pharmaceutical house. Working against time, the purchasing agent and chief expediter had the antidote flown by commercial air freight to Indianapolis, Cleveland, and LaGuardia Field in New York City, then had it shipped to Tripoli via a night plane to London.

Anyone unacquainted with procurement and emergency expediting might find this operation simple. But every step of this job had to be masterminded by long-distance telephone and radio. Shipping instructions had to be given to the seller for overseas packaging and exporting. Dozens of regular U. S. and overseas airline schedules had to be checked to arrange the fastest transit for the antidote. Freight forwarders had to be contacted to help the package along its way. Information had to be given to men at LaGuardia concerning the export declaration, billings, and overseas clearance. Each plane had to be checked at every stop to make sure the package was traveling according to plan. And meanwhile, emergency treatment information had to be relayed to Tripoli by means of army communications facilities.

This successful procurement and expediting operation was one of the more spectacular jobs involving procurement of material and equipment for construction of the larger overseas U. S. defense bases. Fortunately, such life-and-death emergencies are rare. And although huge quantities of material are involved in procurement, it is still basically a "nuts and bolts" operation.

Overseas defense projects are so huge that a single company is not big enough to do all the different types of work involved. Consequently, two or three companies usually com-

Designed for maximum application of power . . . as a dozer or loader. Either 67¾" or 71¼" track length on ground.

Oliver OC-12 Crawler Tractor . . .
prominent wherever earth is moved

Dozing, scraping or loading, this versatile machine seems to be happiest when the going is roughest. The OC-12 has many features which contribute to easy handling and economical upkeep. There's a choice of gasoline or diesel engines; standard or wide track; and optional, specially designed equipment.

Smooth lubrication too!

Shell lubricants are used and recommended by The Oliver Corporation. As they say it, "Shell Oil Company has had a great deal to do with the fine performance of our lubrication system in this tractor and in many others of our line."

Shell Products are made to up the performance of heavy-duty equipment. We invite you to put them to competitive test.

Shell Products used and recommended by Oliver include: Shell Tracrol Lubricant, Shell Rotella Oil, Shell Retinax A Grease and Golden Shell Motor Oil.

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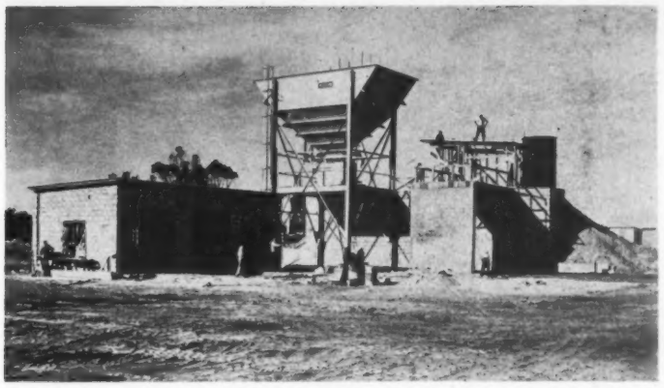

Getting this Butler bin to the site involved a number of steps—actual purchase, packing for export, inspection, and routing. A check is made of all equipment at various stages of its passage from plant to air base.

bine to secure the contract. For the Wheelus Field job, our company combined with J. Rich Steers Co., New York, N. Y., and Shepherd Construction Co., Atlanta, Ga.

This contract calls for the construction of a complete airfield in the desert, and it requires almost 4,000 different types of items for runways, hangars, repair shops, warehouses, hospital, barracks, mess hall, libraries, clubs, sewage system, electric light and power system, fuel-storage facilities, radio and communications center, headquarters, and other installations.

Preliminary survey

The first step in planning a job like this was to have a key executive of the organization go to the job site and make a survey showing what material could be procured from the area or dealers in that part of the world. As an American firm, we wished to give as much business as possible to American suppliers, but economical construction and the schedule of work forced us to consider the speed of delivery and the cost of material. Aside from meeting government specifications, these considerations are the governing factors in such large-scale purchasing.

About half the necessary material for the Wheelus Field job is being obtained through dealers in Tripoli representing concerns in many European and Near East nations. The remainder has to be transported to the site from the U. S.

The analysis of purchasing for this project shows that about half the money for materials and equipment—$17 million—is being spent in the U. S. for such things as generators, calking compound, powerhouse equipment, roofing, iron, boilers, steel, pipe, flooring, switch gear, transmission-line components, pumps for the water supply, and equipment for the sewage line.

Such items as cement come from Tunisia and countries in Europe; glass, paint, linseed oil, turpentine, and cloth from Tripoli; fuel from Bengazi; tile and office supplies from Morocco and Italy; water paints and steel wool from England; and asphalt from the Bahrein Islands.

While this preliminary survey was taking place, two virtually complete organizations were set up—one at the job site and one in the U. S.—for the joint-venture firms. Both offices have a project manager and personnel,

(*Continued on next page*)

Mechanical Loading Speeds Construction

Tractor-Excavators in African copper mines are helping to speed road building projects. The picture above shows an Eimco 105 loading trucks at the rate of 300-350 yards per hour (at left note view of old method which is continuation of featured picture on right hand side).

Speeding highways, construction jobs and earth or rock moving jobs of all kinds is done most economically with Eimco equipment.

The Eimco is revolutionary — it prompts a new concept in estimating the cost of jobs requiring material handling equipment.

In the lower picture at right, the Eimco is loading a piece of rock estimated to contain at least 35 cubic feet. Its shape would require that it be broken to be loaded with other types of equipment but the Eimco easily loads it overhead into the 21 yard rock wagon.

Loading large rock wagons of this type is done 90% efficiently from the end or 100% efficiently from the side. Some jobs in narrow cuts or highway widening jobs must use end loading and no other equipment can perform this operation as economically as an Eimco Tractor Excavator.

THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

New York, N. Y. Chicago, Ill. San Francisco, Calif. El Paso, Tex. Birmingham, Ala. Duluth, Minn. Kellogg, Ida. Baltimore, Md. Pittsburgh, Pa. Seattle, Wash. Pasadena, Calif. Houston, Texas Vancouver, B. C. London, England Gateshead, England Paris, France Milan, Italy Johannesburg, South Africa

B-144

For more facts, use Reader-Reply Card opposite page 18 and circle No. 211

A binder course for the east-west runway extension is put down by a Barber-Greene finisher. Native laborers, working under American supervision, are taught how to work with American equipment.

(Continued from preceding page)

accounting, and procurement departments.

The list of items to be purchased was then divided between the job site office and the stateside office. Most of these items were not purchased as a single order, but were bought from time to time as the job progressed. Lists of material and quantities were made up for one structure at a time—for the 200-man barracks, the 150-bed hospital, the power plant, hangar, warehouse, and numerous other facilities.

These plans were fed piecemeal to both procurement organizations, each of which bought its share of needed equipment and material. The reason for this step-by-step method of purchasing was that plans for structures may be changed several times, even before work is begun. For this reason, such things as roofing are obtained in three or four purchases over a two-year period, instead of all at once. Customarily, rock for concrete and paving work is usually quarried at the job site of an overseas project, while the crusher plant producing the aggregate is purchased by procurement and shipped to the site piece by piece.

Centralized procurement

In the New York office of Crow-Steers-Shepherd, all activity is under the direction of project manager George A. Reznicek. A registered professional engineer and a graduate of Renssalaer Polytechnic Institute, Reznicek had to resign his post as treasurer of the Crow firm when he became project manager on this job, since government regulations prohibit a man in this position from being an officer in a firm doing government work. The New York office, divided into procurement, reports and control, personnel, accounts and auditing, and office service, comes directly under his supervision.

Four divisions

Procurement consists of four divisions: purchase readiness, procurement, expediting and traffic, and accounting. The head of each division is an executive in his own right, for jobs like this last a short time—three or four years—and the usual policy is to hire qualified men for each post and throw them into the work immediately. Usually, there is no time to train either these men or their subordinates.

The head of purchase readiness is required to be a senior engineer, since it is his responsibility to determine engineering requirements and to review bids of a technical nature to assure compliance with drawings and specifications. In this post on the Wheelus Field job is Robert S. Findlay, a man with almost 50 years' experience in many types of engineering and construction.

With a staff of about a dozen people at peak strength, this department handles all work up to and including the issuing of the requisition. It determines the quantities of material needed from plans and specifications and from field requirements. It assembles specifications and descriptions for the guidance of bidders. All this information is then included in the requisitions which it prepares. But even before a requisition is issued, the approval of the contracting officer of the district engineers is secured. Any amendments due to plan changes in the original specifications are also issued from this office. Finally, it receives, examines, and transmits shop drawings submitted for the approval of the architect-engineers.

Purchasing

Heading the purchasing division is procurement manager P. S. Thompson, a man with more than 25 years' experience in contracting as a salesman of material, superintendent in charge of material for a contractor, a

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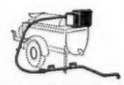

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purchasing agent, a superintendent for warehouse and storage, consultant to the Maritime Commission, and district manager for a big construction firm.

Under Thompson are various purchasing agents who specialize in such items as heavy equipment, plumbing, and heating. Each requisition is assigned to a man familiar with the product required.

At the height of work on the Wheelus Field project, purchasing had about 24 people, and this staff operated in "cells", in which a purchasing agent, a buyer, and a clerk functioned as a unit. When work tapered off and the staff was reduced, this "cell" operation was replaced by an over-all individual assignment procedure.

Sometimes an expediter was assigned to work with a cell to try to forestall trouble from "squeakers"—contracts which seemed to indicate that they would not meet their delivery date. This problem of having vendors meet their promised delivery dates was the biggest facing procurement.

When purchase readiness gives the final okay for a requisition, purchasing analyzes it to determine the best bidder coverage by commodities. In a requisition for a complete heating-ventilating installation, for instance, items are broken down into fans with motors, ducts, boilers, piping, controls, oil burners, tanks, refractory materials, insulation, grills, and other components. Then invitations to bid on each item are sent to the appropriate companies.

A copy of the requisition is posted on the office bulletin board so that any interested vendor who wishes to do so may tender a bid. Sometimes the specifications for an item say that only a particular trade-marked product will be satisfactory. In this case, the manufacturer of the product is asked to submit a proposal. However, government contracts require that competitive bids be obtained for all work and materials whenever possible. Also, an escalator clause bid cannot be accepted if the escalation exceeds 10 per cent.

Fourteen days are generally allowed for bids to come in. Then, bids are opened at a specified time and place in the presence of a representative of the U. S. Army Corps of Engineers. Bids are accepted on the basis of the lowest responsible figure and the best delivery date that will meet government specifications and job requirements.

Value analysis is sometimes used in selecting a bid, but its use is limited on defense projects because of government regulations concerning bidding and the acceptance of bids. There is a little leeway for value analysis, and sometimes conditions make it mandatory to recommend a purchase under this principle. Where this is so, it is because a delivery date is not early enough despite the low-cost figure submitted.

Expediting and traffic

The expediting and traffic division begins to function as soon as it receives a copy of the purchase order made out by procurement. An immediate study of the order is made to determine the importance of the item to the construction schedule, to determine whether it should be transported by air or water, and the need for shop drawing and other okays.

At peak load, about twenty persons were on the expediting and traffic staff, working under the direction of traffic manager Francis R. Novotny. On his shoulders rests the responsibility for getting material and equipment shipped to the job site. He has to be familiar with government bills of lading and government inspection district procedure. He has to be responsible for allocation lists for urgent or high priority material. Part of his job

(*Continued on next page*)

A Caterpillar tractor with dozer works around the crushing and screening plant on the project. Parts for the crusher were bought in the United States. Aggregate for the project is being produced from native rock.

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One gallon is enough to cure from 200 to 400 square feet of concrete depending on the finish. A single coat does the job. Moreover, Konkure saves construction time because it can be applied to concrete as soon as finishing operations are completed. Easy to use, Konkure is applied by a small hand-spray outfit, or on larger jobs, by a one-man power sprayer. One man can cure over 35,000 square feet in an 8-hour work shift.

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Konkure curing compounds conform to strict specifications of U. S. Army Corps of Engineers, U. S. Navy, Bureau of Reclamation, and State Highway Departments. Proof of Konkure's consistent quality is a record of 20 years of use with never a City, County, State, or Federal test failure.

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CONCRETE CURING PRODUCTS AND APPLICATION

For more facts, use Reader-Reply Card opposite page 18 and circle No. 213

Large lumps of earth at the site of the new airfield are broken up by a fig tree which operates as a harrow as it is pulled along by a camel. This also smooths the area prior to sprigging.

is to analyze transportation classification and rules of regulatory bodies. Preparing transport schedules and developing routes for material, knowing the capabilities of ports and the physical and mechanical characteristics of vessels, and being familiar with customs procedures are all part of his job in maintaining control of all cargo transported by various means.

One of the first jobs for this department is to contact the seller of material to confirm the terms of an order and determine when the first approval submittals can be expected. Periodic checks are made by telephone, letter, or a personal visit to the vendor to insure that material will be ready on the promised delivery date.

A card is made out for the item ordered and placed in a tickler file system, since responsibility for the item will shift to expediting in 60 to 90 days after shop drawings have been approved by purchase readiness.

If something goes wrong with an order, field men visit a plant to try to get the job back on schedule. In such emergencies, the expediting and traffic division may ask the nearest of 18 government inspection districts for assistance. If the delay is due to the priority system, the division is responsible for obtaining a priority from Washington for the vendor.

When an item is ready, the department arranges for government inspection by the proper government inspection district. With the inspection request goes a copy of the purchase order, shop drawings, and government specifications. If the item is approved, arrangements are made for a government bill of lading and the government takes control of the material or equipment.

Every item to be sent overseas must be packed for export. The bible on this subject is "Modern Export Packing," a book last issued by the U. S. Department of Commerce in 1940. Under these rules, nothing may be packed in a carton; everything must be in approved wooden containers, waterproof-lined when necessary.

In practice, the packing of material for Wheelus Field generally exceeds the accepted mimumium requirements, since we discovered quickly that they were inadequate for the limited unloading facilities at the port of Tripoli.

The department keeps a check on every item to make sure there is no undue delay in having it delivered to a ship at the port of embarkation, in getting it onto the earliest ship, and in getting it across the Atlantic. Items arriving at the overseas port are taken care of by the traffic department at the job site and any deficiency or damage to equipment or material is reported to New York.

While the item is being expedited, New York reports continuously to the job site, keeping officials informed of all activities, promised actions, and delivery dates.

Accounting

Once procurement has committed the company to make a purchase, it is up to accounting to make sure the bill is paid on time and with the advantage of all discounts. Taking advantage of discounts is important in this work because, should the contractor fail to take it, he would still be liable to the government for the discount lost and it is taken out of his fee.

In this division, as many as 40 persons were employed when the job was

Announcing 2 more new

The new D337
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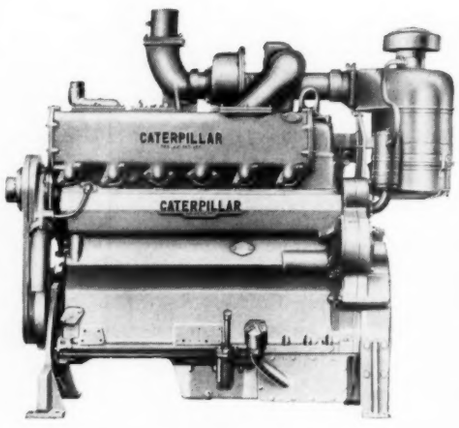

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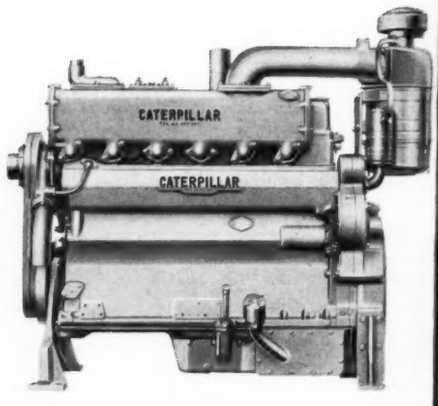

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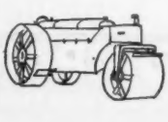

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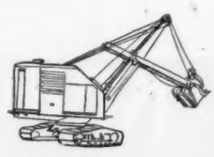

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in high gear. J. J. Murphy, a specialist on construction accounting who has had many years of overseas work, is controller of the Crow-Steers-Shepherd accounting department.

In making payment, this department must make sure the payment procedure does not violate the contract. A large amount of paper work has to be done before it pays the vendor, capitalizing on all discounts. Finally, it seeks reimbursement from the government for all payments, using regular government vouchers with all the necessary papers covering the sale.

The last step in this work is important because the contractor receives payment only after he has presented a voucher together with papers confirming the fact that work has been done according to specifications and government regulations. If a voucher payment is held up, it is frequently necessary to back track and recheck each step, then re-submit the additional proof demanded.

Throughout the life of the project, two agencies keep a check on every aspect of administration. These are the General Accounting Office and the Army Audit Agency. Both make sure that the money spent for the government is spent legally. The Army Audit Agency authorizes reimbursement to the contractor after checking the vouchers and all the supporting papers. The GAO functions like a bank examiner. At irregular intervals of six months or so its men appear without notice to review the entire operation. This sometimes includes a close scrutiny of all records. Similarily a representative of the Army Inspector General's office makes periodic, unannounced inspections. Then, in addition, special government management survey groups have studied the efficiency of our operation from time to time. We feel proud not only to have passed such inspections, but to have won the commendation of auditing and inspection groups for an economical and efficient operation.

Right now, the $60 million Wheelus Field project is practically complete. But for our joint venture, it marks only the end of a chapter, not the end of a story. For Crow-Steers-Shepherd has been chosen by the Corps of Engineers to handle the job of enlarging another base at Asmara, Eritrea, and the project manager and procurement on the Wheelus Field job will be tackling new problems—and benefiting by their experience on our last job.

THE END

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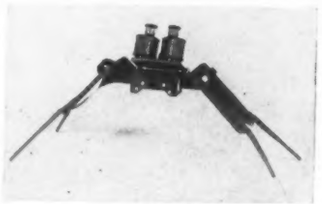

The Hugo Meyer mirror stereoscope.

MS-1 mirror stereoscope, said to greatly increase the range, clarity, and area coverage of a photogrammetric survey; the Model HMSC-1 Stereocomparagraph, for working with pairs of aerial photographs; the Model PS-1 pocket stereoscope; and a 6-inch field range-finder which measures distances up to 100 feet.

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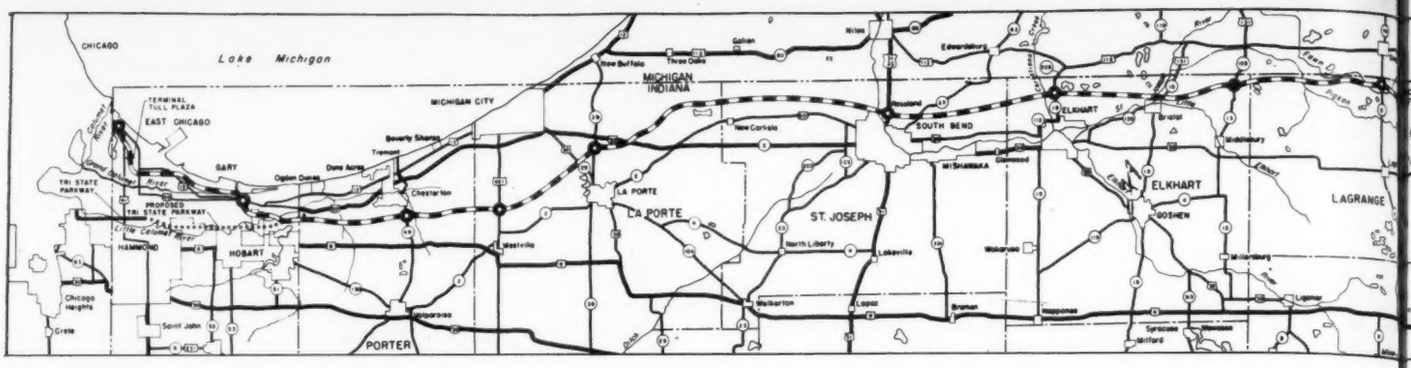
New textbook in French on drilling and boring

The practical and technical aspects of drilling and boring are contained in "Drilling and Boring, Their Function in the Public Works", a textbook in French, by H. Cambefort. The author, a professor at the Special School of Public Works, holds a degree from the National School of Bridges and Causeways in France.

The 397-page text is divided into three parts—perforation of rocks, survey of boring, and drilling in public works—and each section is developed in detail. The varieties of diameters, prisms, tubes, and cables used for borings are analyzed. Electric, magnetic, and radio-active and thermatic deceptions are also treated.

Prefaced by M. Loqueille, doctor of engineering, Ecole Polytechnique, the book is accredited by the Federation of Public Works. Available only in the French edition, the new text may be obtained for $9.50 from Editions Eyrolles, 61 Boulevard Saint-Germain, Paris, France.

←For more facts, circle No. 214



New equipment sets rapid pace on Indiana Toll-Road grading

Spreads of latest models of machinery turn project into huge earthmoving show

A Euclid loader, pulled by an International TD-24 and pushed by an Allis-Chalmers HD-20 tractor, empties material into a Euclid bottom-dump to be hauled to the fill. A rubber-tire Tournadozer gets the "Eucs" off to a flying start.

C&E Staff Photos

The Tournadozer not only assists the Euclid, but also cleans up the spillage after each pass of the loader and prepares the area for the next pass. D. R. Smalley & Sons is grading this stretch near South Bend.

A giant earthmoving-equipment show stretched 156 miles across northern Indiana this season as fifteen or more contractors started grading operations on the $280 million Indiana East-West Toll Road.

New models from almost every well known manufacturer were scattered across the state from Hammond on the Illinois line, where the road will connect with the $80 million Chicago Calumet River Skyway, to Metz on the Ohio line, where the road will join with the Ohio turnpike. When completed in November, 1956, the road will close the last gap in the Chicago-New York toll-road system.

Like other roads in this system—the Ohio, Pennsylvania, and New Jersey turnpikes—the road is being built to handle high-speed traffic safely. Traffic will probably be limited to 65 mph, though the road has been designed for speeds of 80 mph. Curvature is 3 degrees, with a minimum sight distance of 900 feet, a maximum upgrade of 2 per cent, and

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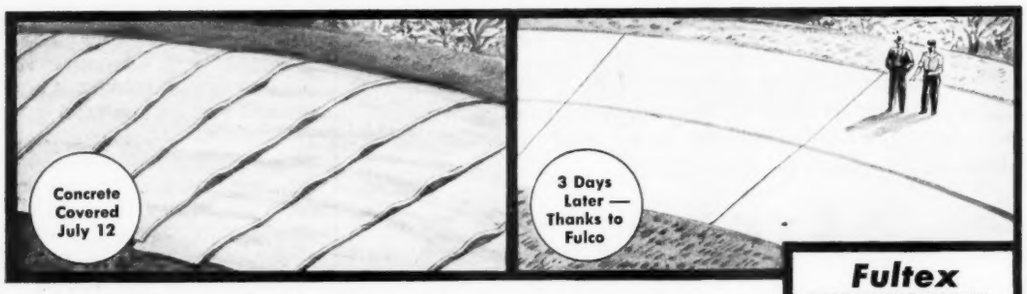

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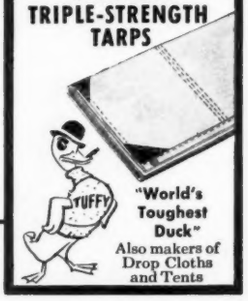

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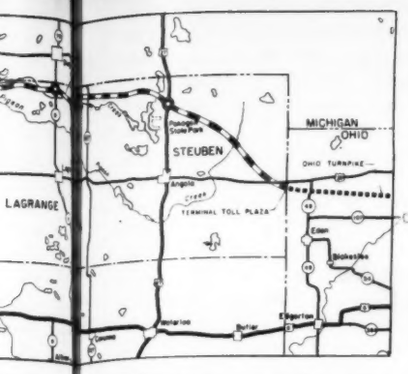

General location map of the new Indiana Toll Road. The alternate-black, and white line indicates the route.

maximum downgrade of 4 per cent. Gradual curves at least every two miles will prevent driving monotony. Twelve interchanges, including the terminals, and ten service areas will be located on the route.

Prominent among the equipment bringing the road to grade this year were Euclid TC-12 tractors and TS-18 twin-powered scrapers; the new Caterpillar D8B and D9 tractors; and Allis-Chalmers HD-21 tractors and Model 360 scrapers.

These are some of the machines preparing the way for work on the 10-inch reinforced-concrete roadways, which will have 8-foot inner bituminous shoulders, 10-foot outer shoulders, and a depressed median 56 feet wide except in the heavily industrialized Calumet area where much of the road will be elevated on steel structures. In all, 260 structures are being built, including 33 railroad overpasses and underpasses and ten major water crossings.

(Continued on next page)

Two Allis-Chalmers HD-21 tractors pushing a Euclid scraper in a double push-loading operation average better than 14 cubic yards per load on one-way hauls of 700 to 1,000 feet. Arcole-Midwest is contractor on this section.

This Vibro-Plus vibrating roller proves useful in compacting the dune sand. The unit, powered by a Waukesha diesel engine and pulled by an Allis-Chalmers HD-5 tractor, is compacting wet sand placed by the scrapers.

One of the new Caterpillar D8B tractors with Gar Wood 25-yard scraper spreads a load of dune sand. Although it looks firm and hard, it lacked density until it was throughly compacted.

(Additional photo on front cover)

NEW "EDG-SUPPORT" frames

for MILLER Model "B" Tilt-Top

Now more than ever, Miller Tilt-Tops are built to take it—built to last! As any contractor knows, heavy crawler tractors concentrate the load along the edge of trailer platforms imposing heavy strains on the overhang section. The NEW Miller frames offset such strains with new, taper formed extension members. Integrally welded to the main side channels, these members extend the full capacity of the main channels out under the entire edge of the platform.

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Model "B" 10 ton $1175*
Optional equipment (priced extra) 16' long platform (8'x14' standard), hydraulic tilt control, 2 speed hand winch and electric brakes.
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research engineers

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This Jaeger pumps all the water a 2" hose can handle Hi-performance Jaeger Model 2PN will actually pump all the water that can be pulled through a 2" suction line under average working conditions. Delivers 10,000 gph when operating at only 2400 to 2550 rpm (as much as 400 rpm below the speeds of similar ordinary pumps). Weighs only 160 lbs. on base, 190 lbs. on pneumatics. For complete information on this model or other Jaeger pumps, see your Jaeger distributor or send for Catalog P-4.

Other sizes 1½" to 10"

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LOADERS • COMPRESSORS • MIXERS • PAVING MACHINES

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(Continued from preceding page)

With the J. E. Greiner Co., Baltimore, Md., as engineering consultant to the Indiana Toll Road Commission, the authorized state agency administering the road, and the New York firm of Parsons, Brinckerhoff, Hall & Macdonald having made the traffic and earnings survey, the highway was divided into 53 contract sections, ranging from less than a mile to more than 5 miles in length.

Grading sections

The first construction contract awarded in September, 1954, to Rieth-Riley Construction Co., Inc., Goshen, Ind., was for a 7.4-mile section near South Bend. Other contracts were awarded in rapid succession during the following months so that practically the entire project was under contract by the beginning of the 1955 construction season.

Most of the general contractors are building more than one of the contract sections. The longest section, 27.9 miles from Elkhart east, is being built by Western Contracting Corp., Sioux City, Iowa. In the heavily built-up sections in the cities of Gary, East Gary, and Hammond at the west end of the route, the work is more complicated and the sections are much shorter.

Dune sand excavated

Just east of Gary, the W. E. O'Neil Construction Co., Chicago, had several spreads at work. This sand-dune area, typical of the south and east shores of Lake Michigan, has a series of ridges roughly paralleling the lake shore, and earthmoving was easiest and most efficient in wet weather. On days when wet conditions forced practically every other contractor on the road to shut down, O'Neil was running full blast.

One spread working in this dune sand consisted of two Allis-Chalmers HD-21 tractors and one Caterpillar D8B with Gar Wood 25-yard scrapers, and a D8 with a Cat 80 scraper. Two HD-20 tractors assisted on the loading cycle and a Cat D7 with dozer helped shape the fill section. Tractors pulling scrapers were equipped with front push plates so that they could push each other when necessary. Even when one or both of the push tractors were not available in the borrow pit, there was practically no delay as the tractor-scrapers assisted each other to get heaping loads quickly.

After testing several compaction devices, O'Neil found that the Vibro-Plus vibrating roller gave the most satisfactory compaction in this sand. Pulled by an Allis-Chalmers HD-5 tractor and powered by a Waukesha diesel engine, the small roller looked insignificant beside the big scrapers on the wide expanse of the fill, but its vibrating effect could be felt for some distance as it went by. This one unit compacted to a high density all of the moist sand placed by the four large scrapers.

Excavate peat areas

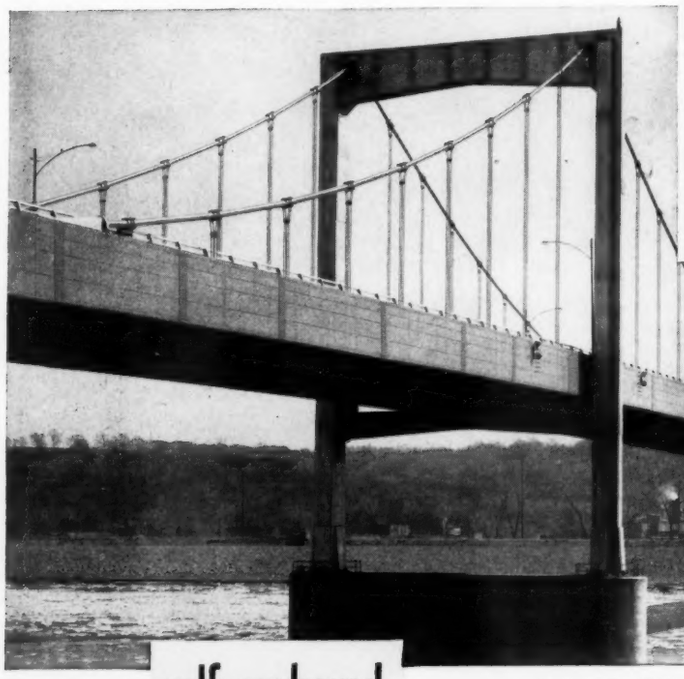
Another spread on this same contract had to cope with quite different conditions where the highway passed through a peat area between the sand dunes. In this spread were four Caterpillar DW20 scrapers, a Cat D8B with U-dozer, and an Allis-Chalmers HD-21 pusher. A Bucyrus-Erie 38-B dragline mucked out the deep wet pockets, loading most of the material into the DW20 scrapers to be hauled to a waste dump. The scrapers then returned to the fill with a load of sand from a nearby borrow pit.

In some of the more shallow peat areas, the scrapers loading the material without a dragline frequently bogged down. To overcome this hazard, a cable attached to the HD-21 was used to pull the scraper, since it was almost impossible to steer the DW20 in the axle-deep muck. It was sometimes necessary to use both tractors to pick up the load and get the scrapers back on the haul road again. Peat pockets averaging about 8 feet deep had wet holes as much as 14 feet deep that had to be mucked out with the dragline. Scrapers hauling peat away also brought sand in on the same cycle, so that the area was backfilled as it was being mucked out.

On another section quite a few miles to the east, Western Contracting Corp. used a Manitowoc 4500 dragline with 140 feet of boom and a Hendrix 5-yard bucket to remove similar peat deposits. Probably the largest earthmoving machine on the toll road, the Manitowoc was able to cast most of the material to the side outside the fill area. Once the peat had been removed, the boom was shortened to 87 feet and an 8½-yard bucket was substituted. The machine then moved into the borrow pits to load sand fill into a fleet of six Euclid LLD 50-ton end-dumps. These big two-engine tandem-axle trucks hauled 35-yard loads to the fills, where the sand was end-dumped and pushed into place by Caterpillar D8 tractor-dozers.

Compaction was obtained on these fills with a Ferguson 50-ton roller pulled by an Allis-Chalmers HD-20 tractor. Even though the sand fill appeared to be well compacted, the big "Eucs" were unable to travel across it with their heavy loads. Consequently, they turned around on hard ground at the end of the fills and backed the full length of the sand fill to dump their loads. Empty,

The Paseo Bridge
at Kansas City



This 1,232-foot bridge spans the Missouri River and is the longest self-anchored suspension bridge in the United States. The total length of the bridge, including two deck plate girder spans is 1,825 feet. Clearance above high water at center of main span is 55 feet.

Engineers:
HOWARD, NEEDLES, TAMMEN & BERGENDOFF, KANSAS CITY, MO.

Contractor, Fabricator and Erector:
AMERICAN BRIDGE DIVISION, UNITED STATES STEEL CORP.

Longest self-anchored suspension bridge in the U. S.

built with American Tiger Brand Pre-Stressed Bridge Strand

The Paseo Bridge over the Missouri River at Kansas City, Missouri, is unique by comparison with other suspension bridges because it is self-anchored. That is, the stiffening girders themselves are designed and utilized to resist the tension of the main cables, instead of having huge anchorages at each end to resist this force.

This bridge has a 616-foot main span and two 308-foot side spans. Main cables are 12 inches in diameter and are built up of 37 strands—31 strands 1 15/16-inch diameter plus 6 strands 1¼-inch diameter. The cables are approximately 1,275 feet long and have a total combined strength of 27,500,000 lbs. To complete the main cables, galvanized soft steel wire is spirally wrapped around the combined strands to protect the cable and provide a smooth surface for painting.

Before shipping, the strands were pre-stressed to one half of their designed breaking strength for several hours. This is not only a thorough test of the quality of the material, but also produces a cable strand that will not stretch over the years due to use.

The stiffening girders carrying two 26-foot roadways are suspended from the main cables by 90 1½-inch diameter galvanized suspender ropes each having a breaking strength of 104 tons. They were also pre-stressed and fabricated to exact dimensions to fit their places in the structure without further work or adjustment.

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UNITED STATES STEEL

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they had no difficulty driving back across the sand. A Caterpillar No. 12 motor grader was kept busy constantly maintaining the haul roads so that the end-dumps could operate at maximum speed.

Grading heavier soil

Between the O'Neil and Western sections were a number of contract sections where the soil was much heavier and where work was slowed down a great deal by rain early in the season.

Several spreads loaded fill material from the borrow pits with draglines and had Euclid bottom-dumps or other haul units bring the material to the job site. One such operation was used on a section being built by Peter Kiewit Sons' Co. and Condon-Cunningham Co., both of Omaha, Nebr. Here a Northwest 95 with a Hendrix 4-yard bucket and a Northwest 71-B with a Hendrix 4½-yard bucket loaded a fleet of Euclid bottom-dumps which hauled from the borrow pits to the fills.

Chapin & Chapin, Inc., Norwalk, Ohio, which subcontracted the earthwork on a 7.4-mile section from Rieth Riley Construction Co., Inc., also hauled much of the fill in Euclid bottom-dumps. This firm used the Rome plow to aerate wet areas of the fills. The Rome disk pulled by an Allis-Chalmers HD-21 tractor forced the excess water to either soak into the fill or to evaporate very quickly. The same rig also scarified the surface of compacted layers of fill to provide good bond with the succeeding course.

One attractive layout was a spread of all new Allis-Chalmers equipment on the section contracted by Traylor Bros. Inc., Evansville, Ind. Here six A-C 360 motorized scrapers handled the sand and clay soil. Allis-Chalmers HD-21 push tractors assisted on the loading cycle and the same model with a dozer attachment spread and shaped the fills.

Loading equipment varies

On the next section, D. R. Smalley & Sons, Inc., Celina, Ohio, used a variety of equipment including six Caterpillar DW21 scrapers and a fleet of 12 Euclid bottom-dumps filled by a Euclid loader. The loader was pulled by an International TD-24 tractor and pushed by an Allis-Chalmers HD-20. A rubber-tire Tournadozer working along with the loader kept the borrow pit straightened up after each pass and also helped the "Eucs" to a fast start by pushing them as soon as they were loaded.

When hauls were long and the twelve Euclids were unable to keep the loader running continuously, the Caterpillar DW21's also pulled under the loader. When there were one or more "Eucs" waiting to load, the scrapers picked up their own load with the aid of a Cat D8 dozer which was working nearby.

Several new Cat D8 tractors were also on this spread including two new Model B's. Both were equipped with dozers, and one was the special pusher model. Fills on this job were

(Continued on next page)

One of the new Euclid TS-18 twin-powered scrapers spreads a load in a thin course on a fill section. This unit also does a good job of compacting the fill as it passes.

"Outperforms Anything on Tracks or Wheels!"

MODEL LD-8
SCOOPMOBILE
1⅝ CUBIC YARD

Long boom, 9-ft. discharge height aid accurate spotting of load. Operator works with outstanding visibility away from all moving parts.

Bucket closing is hydraulically controlled independently of boom, gives full bucket load before lifting action begins.

Quick-change attachments give bonus materials handling uses. Above, pouring concrete with swivel hopper and special high lift track attachment.

Twist-turn flexibility permits scooping or loading in a turn. Maneuvering time saved contributes to higher production. (Enclosed cab optional.)

Four-wheel planetary drive—hydraulic power steering — torque converter with full power reversing transmission—road speeds to 25 m.p.h.—twist-turn flexibility with exclusive Pow-R-Flex coupling of two separate power axle elements. Individual axles oscillate up to 13". Full, positive traction on all four wheels at any degree of twist, turn or oscillation.

Before you buy any front-end loader, let your Scoopmobile dealer show you by actual performance how the LD-8 can do a better, faster loading job for you — why owners say this big scoop "outperforms anything in its class on tracks or wheels!"

COMPLETE RANGE OF CAPACITIES { LD-5, 1 cu. yd.—LD-12, 2½ cu. yd. / LD-15, 3 cu. yd.—LD-20, 4 cu. yd.

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For loading sand into a Euclid 50-ton end-dump, this Manitowoc 4500 dragline is equipped with a 87-foot boom and 8½-yard bucket.

(Continued from preceding page)

compacted by a Bros 50-ton compactor pulled by an Allis-Chalmers HD-19 tractor. Three motor graders, two Caterpillar and one Galion, maintained the long haul roads on this section.

Double push-loading

While most of the contractors seemed to prefer to push-load scrapers with a single push-tractor, there were a number of cases in which double push-loading was used. On one of these, the section being constructed by Arcole-Midwest Corp., Skokie, Ill., where four Euclid and two Caterpillar DW21 tractors were being push-loaded by two Allis-Chalmers HD-21 tractors and one HD-20, the three push-tractors were equipped with rear push blocks so that they could work from either first or second position.

Any two of these pushers immediately got into position and started the loading cycle as soon as the scraper returned to the borrow pit. If another scraper reached the pit before the first one was loaded, the single remaining pusher started loading it. Frequently, with single and double push-loadings taking place side by side, the rigs demonstrated that loading speed was greater with the double pusher and that the scrapers usually got a more heaping load. These six rigs were moving an average of 540 loads per 10-hour day and were averaging better than 14 cubic yards per load on a one-way haul of 700 to 1,000 feet.

The scrapers on this spread were doing such a good job of spreading the material that even with six scrapers it was unnecessary to have a dozer on the fill. Though one Caterpillar 12 motor grader did what straightening up was necessary and maintained the haul roads, skillful operators placed the shallow uniform lifts of fill with motor scrapers alone. A Bros 50-ton compactor pulled by an Allis-Chalmers HD-19 tractor provided the necessary compaction.

Other push-loading operations

On an 8.7-mile section just west of Elkhart, Louis Garavaglia and Pierson Contracting Co., Center Line, Mich., used a combination of track-type and rubber-tire tractors to do the pushing on a double push-loading operation. Four Allis-Chalmers 360 scrapers and two Tournapull C Roadsters were the haul units. The scrapers were loaded in the borrow pit by a Caterpillar D8 pusher assisted by a Model Twin C Tournapusher consisting of two LeTourneau-Westinghouse C tractors coupled together. The powerful four-wheel two-engine machine was controlled by a single operator, and in spite of its clumsy appearance, it handled well and made up in speed what it lost in maneuverability.

Twin-powered scrapers

Among the biggest and newest of the scraper fleets were two spreads of the new Euclid TS-18, believed to be the first ten delivered, operated by the Western Contracting Corp. Working with them were four of the powerful Euclid TC-12 tractors. Each spread was supplied with five TS-18 scrapers and two TC-12 tractors. Four scrapers were operated at a time, and one was held in reserve.

While these rigs were being loaded, there was an obvious surge of power as the two engines of the scraper applied their 494 horsepower to the unit's four rubber-tire wheels and the two similar engines of the tractor applied an equal horsepower to the tracks of the pusher. The result was a smooth and uniform cut from the

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Job-Rated
TRUCKS
WITH THE *FORWARD* LOOK

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borrow pit, and a heaping load in a few seconds. As the loading was completed, the tractor picked up speed to move the scraper out of the pit.

Each of the big rigs averaged 200 cubic yards per hour on one-way hauls of 2,000 feet. An average of 8,000 cubic yards per 10-hour shift was moved by each of the two spreads. Since they were operated on two shifts, each spread was able to move 16,000 cubic yards per day. On shorter hauls, the figure was somewhat higher, and on the longer ones, there was very little drop from the machine production of 200 cubic yards per hour.

To illuminate the work areas for night shifts, Western used eight 50-foot telescoping light towers which were fabricated in their own shops. A tower was mounted on a GMC war-surplus 6 × 6 truck along with a 16-kva generator. The generator, made by Duplex Truck Co., Lansing, Mich., was powered by a Hercules gasoline engine and each of the towers carried eight 1,500-watt floodlights capable of making a large area bright enough for the safety and convenience of the night shifts.

This season's pace of work on the Indiana East-West Toll Road made it obvious that all of the contractors are operating at peak efficiency to get their contracts completed by the established deadline, and thus open the road to paying traffic. And it also was obvious that, while rushing work to completion within contract limits, they are going to the latest and best models of earthmoving equipment—equipment which will return them a profit on their bids.

THE END

New direct-drive saw has automatic chain oiler

■ The Luther Corp., Rockford, Ill., announces its new Indian chain saw, a direct-drive unit said to incorporate several exclusive features. The new saw is driven by a Power Products 3-hp 2-cycle engine.

According to the manufacturer, the new Indian model is the first direct-drive chain saw to offer a pressure-feed, entirely automatic chain oiler, plus auxiliary manual oiler. Each can be operated independently.

A specially designed oil filter cap which prevents sawdust from entering the oil reservoir is also a feature of the new unit, as well as an adjustable chain tension clamp, a heavy-duty multiplier-type clutch, and a combination carburetor guard and toe plate to facilitate starting.

For further information write to the company, or use the Request Card at page 18. Circle No. 28.

The Indian direct-drive chain saw.

Auxiliary cylinder boosts hoist capacity

■ A triple-cylinder platform body hoist for trucks, said to provide 62 per cent increased capacity over the Model 44 twin hoist, has been introduced to the field by Daybrook Hydraulic Division, L. A. Young Spring & Wire Corp., Bowling Green, Ohio.

The new Model 444 direct-lift-type hoist employs an auxiliary or booster cylinder which applies the initial lifting force to the forward part of the platform body until the body reaches a 15-degree angle. Then two rear cylinders take over.

Especially recommended for use in hauling concrete blocks and other construction materials, the new hoist can be mounted on single-axle trucks with cab-to-axle dimensions of 84 inches to 120 inches and body lengths from 10½ feet to 16½ feet, and on tandem-axle trucks with cab-to-axle dimensions of 72 inches, 84 inches, or 102 inches, and body lengths from 10½ feet to 16 feet.

The Universal Model 444 platform truck-body hoist features a booster cylinder (right) which applies the initial lifting force in a dumping operation.

For further information write to the company, or use the Request Card at page 18. Circle No. 188.

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New rear-end modifications (as shown in the lower photo) keep materials IN the hopper. Construction permits use of tail gate chain, so the flow of material may be properly controlled.

Hauling contractors in all sections are multiplying the work of their trucks by converting to HOBBS Schonrock Cable Dump TRAILERS. Equipped with a HOBBS Schonrock Cable Dump TRAILER one truck can do the work of two, three, and sometimes four conventionally equipped dump-body trucks. In this way you take full advantage of greater gross load capacities in accordance with state bridge formula laws. This naturally means greater net operating profits.

HOBBS Schonrock Cable Dump TRAILERS are available in single and tandem axle models.

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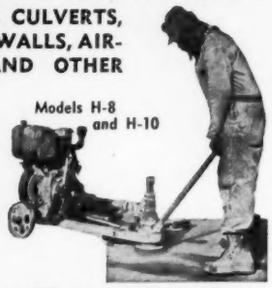
FOR BRIDGES, DAMS, CULVERTS, HIGHWAYS, FLOORS, WALLS, AIRPORT RUNWAYS, AND OTHER APPLICATIONS

Models H-8 and H-10



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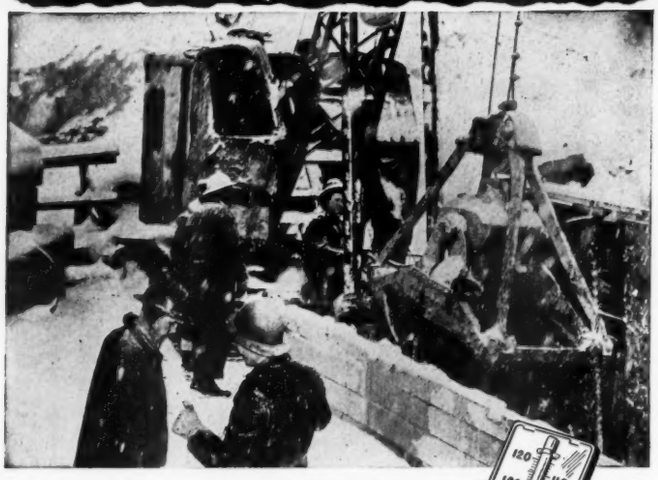

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In a majority of "run-of-the-mine" jobs and most of the exceptionally noteworthy projects you'll find Owen Buckets handling important digging and material handling operations.

That is true whether it is a bridge abutment, a dam foundation, caisson work, deep trenching, aggregate handling or "what have you."

The Hungry Horse Dam is an example. Thirty degrees below zero weather didn't stop operations or hinder this Owen Bucket in performing the desired service required in deep down digging of frozen clay, shale, etc.

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For more facts, use Reader-Reply Card opposite page 18 and circle No. 224

The Cedarapids pugmill conveyor attachment mixes just the right amount of calcium chloride and water with aggregate to provide a dust-free, smooth, stable road surfacing material.

Calcium chloride, water added to aggregate by conveyor attachment

■ A new delivery-conveyor attachment that thoroughly mixes water and calcium chloride with aggregate before it is discharged from surge bins or gravel plants into trucks has been announced by Iowa Mfg. Co.

The new mixing unit eliminates the need for other sprinkling or spraying equipment on the road bed, according to the manufacturer, as it correctly proportions calcium chloride and moisture and adds them to the aggregate to provide a gravel or crushed-rock road surface that is free from dust, compacts to a smooth hard surface, and remains relatively stable.

The Cedarapids volumetric proportioning continuous-mixing-type pugmill attachment fits under the head pulley of a delivery conveyor. It contains an 18-paddle pugmill which thoroughly mixes the material and discharges it into the truck body. Also included in the mixing unit is a 2-inch spray-bar to spray the proper amount of water into the aggregate as it is mixed. Optional equipment which adapts the unit to various road surfacing methods includes a calcium chloride feeder, a water meter, a quick-close valve, and a water pump.

The calcium chloride feeder, which is used in most installations, consists of an enclosed bin unit and a short conveyor belt to add a controlled amount of calcium chloride to the aggregate on the delivery conveyor belt. This unit is driven by the conveyor power unit.

The new equipment can be added to the delivery conveyor of all types of portable and stationary surge bins, and is available on special Cedarapids 5 and 10-yard portable bin units. With special adaptation, the unit can be fitted on the delivery conveyor belts of portable gravel crushing and screening plants.

For further information write to the Iowa Mfg. Co., 916 N. 16th St., Cedar Rapids, Iowa, or use the Request Card at page 18. Circle No. 123.

New asphalt plant produces cold-mix

■ Bituminous paving mixes made with cold dry aggregate and heated bitumen are produced in a new stationary asphalt plant added by White Mfg. Co., 1227 W. Beardsley Ave., Elkhart, Ind., to its line of hot plants.

The new model has a capacity of 40 to 50 tons per hour. It consists of a twin-axle pug mixer, a two-compartment aggregate bin with recombining hopper, weigh scales for aggregate and bitumen, a bucket elevator, and a two-bin reciprocating feeder with adjustable gates.

Discharge gates of the storage bins, hopper, and mixer are air-operated. A single engine or electric motor drives the entire plant. One man operates the plant, with a helper to supply material to the feeder.

Hot-mix asphalt can be produced by the plant with the addition of a dryer.

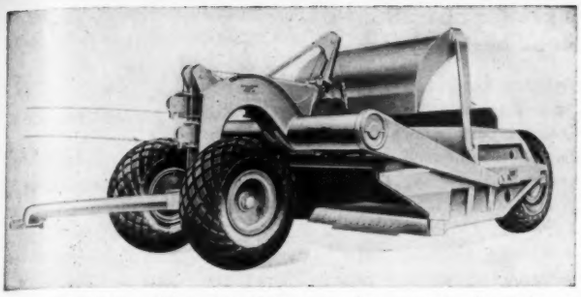
For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 54.

Drafting-room furniture described in catalog

■ A 16-page catalog illustrating and describing its line of drafting-room furniture is available from the Frederick Post Co.

Various types of filing units, including Hamilton vertical files for storing reference plans, blueprints, charts, and maps, are pictured. Other furniture shown includes adjustable tables, chairs, and stools.

To obtain this catalog write to Frederick Post Co., 3650 N. Avondale Ave., Chicago 18, Ill., or use the Request Card at page 18. Circle No. 21.



The new Cat No. 463 scraper, featuring a longer, wider bowl, has a heaped capacity of 25 cubic yards.

New 25-yard scraper features lower bowl

■ A new crawler-drawn scraper with bowl-design features which give it greater heaped capacity has been introduced by Caterpillar Tractor Co. to replace its No. 80 scraper. The unit, second largest model in the Caterpillar line, has a struck capacity of 18 cubic yards and a heaped capacity of 25 cubic yards.

Featuring Caterpillar's exclusive Lowbowl design, the new No. 463 cable-operated scraper has lower sides which reportedly give less loading resistance because material in the bowl is not lifted so high and incoming material meets less overhead weight. The low lifting height also is said to reduce internal friction.

Its longer, wider bowl is designed to give this new scraper a faster loading rate that continues to the end of the loading cycle. According to the manufacturer, horsepower is utilized more efficiently with less loading resistance. The higher apron lift and greater ground clearance of the No. 463 are said to further contribute to loading and spreading efficiency.

Positive dozer-type ejection, assuring complete bowl emptying, as well as adjustable ejector guide roller, protected cables, and straddle-mounted rear wheels with adjustable axle height are among the features claimed for the No. 463. Adjustable rear axles provide ample clearance, whatever size tires are used. The cutting edge of the new scraper is Hi-Electro hardened and is reversible. A large, rugged push block makes pusher contact easy.

The new scraper has a load capacity of 55,000 pounds. Over-all dimensions are: length, 38 feet; width, 11 feet 9 inches; height, 11 feet 1½ inches (blade on ground); and wheelbase, 23 feet 1½ inches.

For further information write to Caterpillar Tractor Co., Peoria 8, Ill., or use the Request Card at page 18. Circle No. 83.

New 3-wheel roller has power brakes

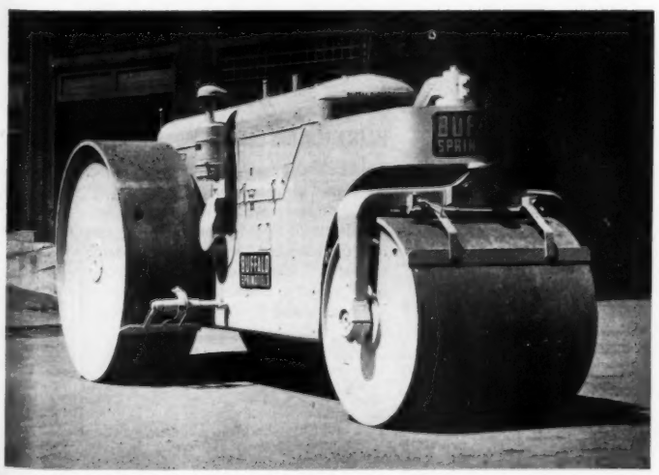
■ The first application of power brakes to three-wheel rollers has been announced by the Buffalo-Springfield Roller Co. Tapered roller bearings on both the guide and drive rolls are also standard equipment on the company's new 10 to 14-ton and 12 to 15-ton heavy-duty variable-weight three-wheel rollers.

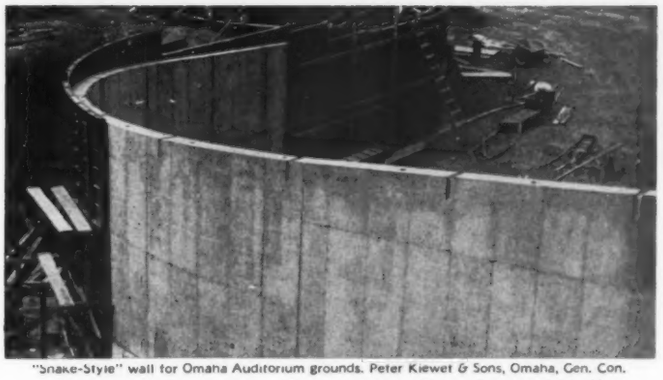
Vacuum hydraulic-powered brakes on both drive rolls and a mechanical parking brake mounted on the transmission are said to provide complete and positive braking control of these new rollers at all times under all conditions.

A number of other engineering features, including four-speed transmission, special torque-proportioning bevel-gear differential, high-speed low-torque clutches, and an improved hydraulic steering system, are said to give these rollers unusual maneuverability, ease of operation, and long dependable performance with a minimum of repair and downtime expense.

In addition to the four-speed transmission drive, a torque converter is also available as optional equipment.

For further information write to the Buffalo-Springfield Roller Co., 1210 Kenton St., Springfield, Ohio, or use the Request Card at page 18. Circle No. 12.





"Snake-Style" wall for Omaha Auditorium grounds. Peter Kiewet & Sons, Omaha, Gen. Con.

Symons Forms on Serpentine Retaining Wall

Symons Forms were used exclusively to form this serpentine retaining wall which is 20 feet high at the highest point and slopes to 8 feet high at the lowest point. These walls were constructed to facilitate parking on the grounds of Omaha, Nebraska's new city auditorium. Symons Forms were used for 30,000 square feet of forming on this job.

Send plans for your next job and get complete layout and cost sheet—no obligation. Catalog F-10 sent FREE upon request. Symons Clamp & Mfg. Co., 4251 Diversey Avenue, Dept. K-5, Chicago 39, Illinois.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 225

Putting the Thruway Thru

CONTINENTAL MOTORS — Powerful as the Nation — AMERICA'S STANDARD ®

. . . with a Big Assist from Red Seal Power

Specialized machines such as this Model "GB" Blaw-Knox Precision Subgrader account for the amazing rapidity with which the highway network is expanding to meet this country's needs. This unit, with its extra discharge horn permitting discharge of spoil at either end, is only one of a steadily-lengthening list of special-purpose equipment utilizing Red Seal power. You find Red Seals, today, building prestige for the makers—and earning *profits* for the users—of leading makes of pavers, graders, mixers, compressors, earth-movers, ditchers, shovels, rollers and numerous other machines. You can clinch on-time performance by standardizing on equipment which offers the plus-value of dependable Red Seal power.

4-CYCLE ENGINES FOR INDUSTRY AND FARM

In addition to its large engines, Continental builds an outstanding line of heavy-duty air-cooled four-cycle models for farm and industrial applications requiring 2 to 3 h.p. Advanced engineering gives them easy starting, high dependability, and unusual lugging capacity at low speeds . . . Cp-

tions: patented and exclusive Contex® external ignition system, low-level ignition cut-off, 6-1 reduction gear, and other features. Available also for use on kerosene . . . For information on these models, address Air-Cooled Industrial Engine Division, 12800 Kercheval Ave., Detroit 15, Michigan.

SERVICE FACILITIES AND GENUINE RED SEAL PARTS ARE AVAILABLE EVERYWHERE

Continental Motors Corporation

MUSKEGON • MICHIGAN

6 EAST 45TH ST., NEW YORK 17, NEW YORK • 3817 S. SANTA FE AVE., LOS ANGELES 58, CALIF.
6218 CEDAR SPRINGS ROAD, DALLAS 9, TEXAS • 910 S. BOSTON ST., ROOM 1008, TULSA, OKLA.
1252 OAKLEIGH DRIVE, EAST POINT (ATLANTA) GA.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 226

Equipped with a 165-hp turbocharged diesel engine, the Michigan 175A tractor-shovel boasts greatly increased power.

Diesel unit boosts power of tractor-shovel model

■ The introduction of a turbocharged diesel engine rated at 165 horsepower for the Michigan Model 175A tractor-shovel has been announced by the Construction Machinery Division of Clark Equipment Co. The new power arrangement is said to make the 175A the most powerful rubber-tire tractor-shovel on the market.

Equipped with a 2¼-cubic-yard bucket and weighing 24,100 pounds, the 175A has four-wheel drive and rear-wheel steering. It features a torque converter, power-shift transmission, and planetary-wheel drive axles. Four forward and four reverse speeds, with a maximum speed of 27 mph, give the unit good maneuverability.

For further information write to the Construction Machinery Division, Clark Equipment Co., P. O. Box 358, Benton Harbor, Mich., or use the Request Card that is bound in at page 18. Circle No. 109.

Acetylene torch rig cuts structural steel

■ A new type of oxyacetylene torch combination for cutting heavy steel structurals has been announced by The K-G Equipment Co., Inc., 1744 Lehigh St., Allentown, Pa. According to the manufacturer, the new Flame Saw compares favorably in efficiency with mechanical sawing units selling at several times its purchase price.

Reduced handling, setting-up, and operating costs, as well as increased speed and accuracy of cutting at any angle, are outstanding features claimed for the unit. Easily moved from one spot to another, it requires only a 110-volt power supply and an oxygen and fuel gas setup. The addition of extra length of track and a radius rod makes the saw adaptable to any straight-line or circle-cutting job. A roller-bearing-wheeled, table-height, tubular steel carriage improves the portability and versatility of the unit.

The K-G Flame Saw will cut structural members ranging from 3 to 36 inches in width, and will make any angle miter cut. Cutting speed is said to be such that the saw will cut through a 24-inch beam in one minute.

For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 93.

Data on proper operation of overhead bucket crane

■ To enable users of overhead traveling bucket cranes to obtain maximum cable life and top performance from their clamshells, the Blaw-Knox Co. has published an eight-page folder containing illustrations and operational guides.

Photographs and diagrams illustrate the relationship between the preferred or required direction of bucket opening, location and contours of the piles of material, and position of the holding and closing drums in the overhead crane trolley.

Form 2510 is a supplement to Bulletin 2373 R on maintenance and care of clamshells. This literature may be obtained by writing Blaw-Knox Co., Box 1198, Pittsburgh 30, Pa., or by using the Request Card at page 18. Circle No. 8.

Rollers with power brakes

■ A development said to involve the first application of power brakes to three-wheel road rollers has been announced by Buffalo-Springfield in a new bulletin. This literature covers the new heavy-duty 10 to 14-ton and 12 to 15-ton rollers, and describes the power brakes and other improved performance features, including tapered roller bearings on all rolls.

To obtain Bulletin S-69-855 write to Buffalo-Springfield Co., 1210 Kenton St., Springfield, Ohio, or use the Request Card at page 18. Circle No. 136.

Best bet for better bids–

SPECIFY

GENERAL MOTORS DIESEL POWER

in all your construction equipment

You can *specify* General Motors Diesel power in over 750 different models of equipment built by over 150 manufacturers.

When you do you'll get fast-acting, quick-accelerating 2-cycle Diesel power that will help you do more work, faster, at less cost.

More work, because a General Motors Diesel is a "high torque" engine. And torque—as much as developed horsepower—measures an engine's working ability.

Faster work, because a GM 2-cycle Diesel, with its responsive governor, efficient fuel injectors and power at every piston downstroke, gives you instant pickup in response to changing loads.

Less cost, because a General Motors Diesel burns fewer gallons of safer, cheaper fuel. Also a GM Diesel costs less to buy and the parts cost less than for other Diesels of comparable ratings.

No matter where your contracts take you, you'll find GM Diesel distributors ready to supply fast service and quick delivery of low-cost factory parts. Check your local distributor today for full details on dependable, low-cost Diesel power for your equipment, or write direct for more information.

PURCHASED 23 GM DIESELS SINCE 1947

This LeTourneau-Westinghouse Tournapull is part of an earth-moving fleet used by the Lone Star Steel Company of Lone Star, Texas. The Company, one of the largest producers of steel in the Southwest, has been a consistent user of General Motors 2-cycle Diesel engines in several different kinds of earth-moving, construction and mining equipment for better than seven years.

GM GENERAL MOTORS DIESEL POWER

The Rice Model 20M centrifugal pump is adaptable to a variety of power units.

New pump will operate from various power units

■ A new model in the line of centrifugal pumps manufactured by Rice Pump & Machine Co. is reportedly a highly adaptable unit. Although the new pump is basically designed for use with a Wisconsin 15-hp twin-cylinder engine, the frame size and design permit the use of a single-cylinder gas engine, a diesel engine, or electric motor as a power source.

The Model 20M is capable of pump pressures ranging up to 60 pounds, and delivers 20,000 gph.

For further information write to the Rice Pump & Machine Co., Belgium Wis., or use the Request Card that is bound in at page 18. Circle No. 199.

SAVING $170.00 A MONTH IN FUEL ALONE

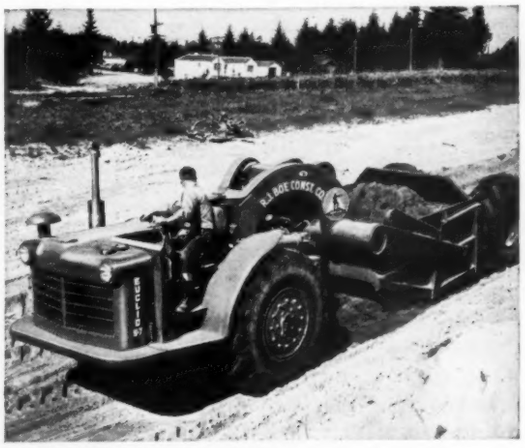
United Construction Company cut fuel costs over 60% and reduced maintenance costs when they *switched* from gasoline to GM Diesel power on their Moretrench pumps. The GM Diesels worked 24 hours a day, 7 days a week—eliminated pumps formerly required to pull and service spark plugs every three days and to replace them every three weeks.

13,000 HOURS—NO REPAIRS

General Contractor A. H. Famularo bought this GM Diesel-powered Northwest 25 Crane in April 1947. In 13,000 hours he never had an injector out, never touched the head or pan. He burns 16 gallons of low-cost Diesel fuel in 8 hours—specified GM Diesel power "because it was economical . . . and has proved to be reliable."

25% MORE WORK; FUEL COSTS ⅓ LESS

Gillough Construction Company has *standardized* on GM Diesel power for their portable rock crushing plant in Kansas. The firm uses six GM Diesels to run a hammer mill, operate conveyors and screens, a primary crusher and two shovels. One shovel, converted from gasoline to GM Diesel power, now does 25% more work on one-third less fuel cost.



"WONDERFUL PERFORMER"

This GM Diesel-powered scraper hauled nine yards every four minutes on a recent job for the R. J. Boe Construction Company. Contractor Russell Boe likes the "wonderful acceleration and trouble-free performance GM Diesel power gives me." He says, "All you need to do is keep water, oil and clean fuel in that GM Diesel and you'll get a good day's work out of it."

DETROIT DIESEL ENGINE DIVISION

GENERAL MOTORS • DETROIT 28, MICHIGAN

Single Engines . . . 30 to 300 H.P. • Multiple Units . . . Up to 893 H.P.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 227

CONVENTION CALENDAR

November 14–16 American Concrete Pipe Association

Meeting, Chase Hotel, St. Louis, Mo. Howard F. Peckworth, managing director, ACPA, 228 N. LaSalle St., Chicago, Ill.

November 27–December 2 American Institute of Steel Construction

Annual Convention, Boca Raton Hotel, Boca Raton, Fla. L. Abbett Post, executive vice president, AISC, Inc., 101 Park Ave., New York 17, N. Y.

December 1–2 Mississippi Valley Flood Control Association

Meeting, Hotel Roosevelt, New Orleans, La. Bruce Tucker, executive vice president, MVFCA, 203 Hotel Peabody, Memphis, Tenn.

December 7–9 American Association of State Highway Officials

Meeting, Jung Hotel, New Orleans, La. J. A. Kinkead, reservations chairman, AASHO, Department of Highways, Baton Rouge, La.

December 12 New York State Bituminous Concrete Producers Association

Meeting, Waldorf Astoria Hotel, New York, N. Y. Gus Rayner, executive secretary, NYSBCPA, 30 Niblock Court, Albany, N. Y.

January 6, 1956 Northeastern Weed Control Conference

Meeting, Hotel New Yorker, New York, N. Y. Richard J. Aldrich, secretary, Farm Crops Department, Rutgers University, New Brunswick, N. J.

January 11–14 American Road Builders' Association

Annual Convention and 1956 Highway Materials and Supplies Exhibit, Miami Beach Municipal Auditorium, Miami Beach, Fla. Norman T. Almquist, administrative services manager, ARBA, World Center Bldg., Washington, D. C.

January 12 National Constructors Association

Meeting, Plaza Hotel, New York, N. Y. C. B. Bronson, secretary, NCA, 50 E. 41st St., New York, N. Y.

January 12–14 Associated General Contractors of Minnesota

Meeting, St. Paul Hotel, St. Paul, Minn. R. J. Hendershott, manager, AGC of Minnesota, 910 Builders Exchange Bldg., Minneapolis, Minn.

January 17–20 Highway Research Board

Thirty-fifth Annual Meeting, Sheraton-Park Hotel, Washington, D. C. Fred Burggraf, director, HRB, 2101 Constitution Ave. N. W., Washington 25, D. C.

January 29–February 2 Associated Equipment Distributors

Annual Meeting, Conrad Hilton Hotel, Chicago, Ill. P. D. Hermann, executive secretary, AED, 30 E. Cedar St., Chicago, Ill.

February 6–8 Georgia Quality Concrete Short Course

Fifth Annual Short Course of Instruction, Auditorium, School of Architecture, Georgia Institute of Technology, Atlanta, Ga. Prof. Radnor J. Paquette, School of Civil Engineering, Georgia Institute of Technology, Atlanta.

Technical center for Houston

A new Technical and Scientific Center to provide space and professional services for members of the city's technical societies and engineering groups is planned by the Houston Engineers Club, and will bring together the many diversified technical fields in the area.

The first such centralized facility for technical societies in the country, the center will make Houston the engineering headquarters of the Southwest.

The Bell Model 47G helicopter takes off from the base of King's Mountain with a crate of equipment for the construction crew. The helicopter took an average of one ton of material to the work site per hour in this one-day operation.

Construction airlift has timing and control

Crew and 10 tons of material and equipment are flown to virtually inaccessible site to build microwave tower

Building and maintaining access roads may be a problem on some construction projects, but it was completely avoided by Western Farmers Electric Cooperative of Oklahoma when the firm built a microwave tower for its communication system.

The 50-foot steel tower was erected atop King's Mountain, which, though it is only 2,300 feet high, is almost inaccessible from the ground. A man can scramble up the rocky slope in an average time of two hours—that is, if he is not burdened by equipment. The terrain is so rough that blazing an access road or building a tramway to the site was impractical for economic reasons.

So Western took to the air, using a Bell helicopter in a small-scale airlift to get men and equipment to the job quickly. In 9½ hours, the craft transported more than 10 tons of building material and communication equipment, as well as the construction crew, to the top of the mountain.

This one-day operation started early one morning after all the necessary equipment had been assembled at the base of the mountain, each individual piece of equipment marked as to content and weight. The crew of four workmen who were to build the concrete foundation for the 8× 12-foot equipment office and the microwave tower were in the first lift

Resists Shock!

Are the bearing units in your equipment subjected to heavy shock loads? Then, switch now to Sinclair HEAVY DUTY BEARING GREASE for better lubrication, longer bearing life. This *extreme pressure* grease is specially compounded for severe service lubrication in construction, mining and quarrying equipment.

Tests prove Sinclair HEAVY DUTY BEARING GREASE *resists shock loads, water, heat, throw-off,* and *squeeze out.* Try it—for longer bearing life... higher productivity... lower operating costs.

A Sinclair Lubrication Engineer can give you expert counsel on how to get the most out of your equipment with Sinclair HEAVY DUTY BEARING GREASE. Phone your local Sinclair Representative or write Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y. *There's no obligation.*

SINCLAIR

HEAVY DUTY BEARING GREASE

For more facts, use Reader-Reply Card opposite page 18 and Circle No. 228

DUDGEON HYDRAULIC JACKS

SALES RENTALS

CAPACITY TO 600 TONS

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789 BERGEN STREET BROOKLYN, N. Y.
• ST 9-4040 •

For more facts, circle No. 327

Coming back for another load, the 200-hp helicopter hovers over the trench it straddles while equipment is hitched to a sling underneath the craft. Construction and loading crews controlled the flow of supplies by a walkie-talkie system.

made. A special three-man crew from the microwave supplier was on hand to install the equipment and tower. After bringing in the crew, the 200-hp helicopter made subsequent trips to bring in such items as shovels and tools, form boards, gravel, and cement.

The Model 47G helicopter straddled a trench made in the ground by a tractor and bulldozer while supplies were hitched to a sling underneath. The largest single piece of equipment carried by the craft was the 471-pound microwave station itself. Altogether, 3 yards of dry-mix for concrete, the 8×12 prefabricated building, form lumber, conduit wire fixtures, the 50-foot steel tower, two 6-foot microwave antennas with cables and fittings, a 60-watt base station, microwave transmitter and receiver, auxiliary receivers, voltage regulators, 2,000 feet of galvanized iron pipe, a 3,500-watt propane standby generator, and all needed tools were flown to the site.

Walkie-talkies were used to coordinate the operation, so that needed material was flown to the site at the right moment. Just before noon, when the temperature hit the 100-degree mark, a call for drinking water was filled in just a few minutes.

THE END

Line of aggregate dryers

■ A line of aggregate dryers for use in connection with asphalt plants is illustrated in literature available from the Posey Iron Works, Inc., 560 S. Prince St., Lancaster, Pa. Details of construction and operation of the Iroquois dryers are included in the illustrated bulletin.

According to the literature, the dryers are available in standard sizes of 48, 54, 66, 78, and 84-inch diameter. The company will also design and build dryers to customers' specifications.

To obtain Bulletin No. 403 write to the company, or use the Request Card at page 18. Circle No. 190.

New powder-actuated tool does most fastening jobs

■ A new powder-actuated tool said to simplify on-the-job fastening has been introduced by The Ramset Fastening System, Winchester-Western Division of Olin Mathieson Chemical Corp., 12117 Berea Road, Cleveland 11, Ohio. Known as the Duo-Jobmaster, this new unit is an improved model of the company's popular Jobmaster fastener.

The Duo-Jobmaster is said to be capable of handling more than 90 per cent of the fastening jobs in heavy construction. Its main feature is that it can be used for either a ⅜-inch stud or a ¼-inch stud with only a simple change of the barrel. Formerly, the entire lower assembly had to be changed to make this possible. Low recoil and easy maintenance are also stressed by the manufacturer.

For further information write to the company, or use the Request Card at page 18. Circle No. 64.

The Ramset Duo-Jobmaster uses either a ⅜ or ¼-inch barrel.

Anything Less is an Old-Fashioned Truck!

If you don't get all the modern advantages new Chevrolet trucks offer, you stand to lose money on the job today and at trade-in time tomorrow

Look at it this way. The more modern the truck, the more quickly and efficiently it does the job. And if it's loaded with ultra-modern features, you're bound to be farther ahead at trade-in time. Now look at the way Chevrolet fills the bill. Even so-called new trucks are old fashioned without all these Task-Force advantages!

Shortest stroke V8's* of any leading truck—the most modern truck engines money can buy! Their compact, short-stroke design means longer life, because of less friction and wear. Chevrolet's extra-rugged and dependable high-compression valve-in-head Sixes are ultra economical to keep humming. They squeeze more power out of a tankful of gas!

The latest in cab comfort and safety—High-Level ventilation, panoramic windshield, concealed Safety Steps—features that boost driver efficiency!

Most modern chassis features—new suspension, more rigid ladder-type frames, Power Brakes standard equipment on 2-ton jobs!

Work Styling—Here's heavy-duty styling that's matched to the job; modern styling that calls attention to your business! Your Chevrolet dealer has complete details. See him soon. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

**V8 standard in L.C.F. models, an extra-cost option in all others except Forward-Control models.*

NEW CHEVROLET Task-Force TRUCKS

CHEVROLET

For more facts, use Reader-Reply Card opposite page 18 and Circle No. 229

(Adv.)

Inside Facts on

ALLIS-CHALMERS NEW HD-6 SERIES TRACTORS

more performance . . .
FOR SUSTAINED HIGH OUTPUT!

more versatility . . .
FOR A WIDER RANGE OF WORK!

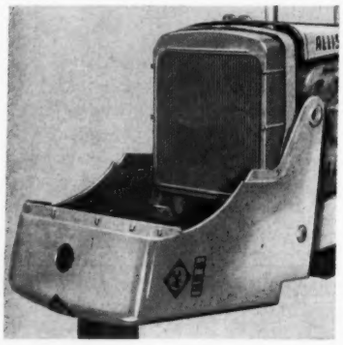
more dependability . . .
FOR LOWER JOB COSTS!

TWO NEW

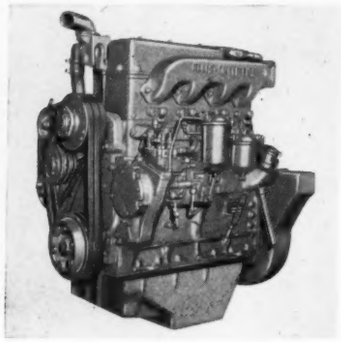
HD-6

BULLDOZER-DRAWBAR TRACTOR

Weight	12,400
Drawbar hp	45
Belt hp	55



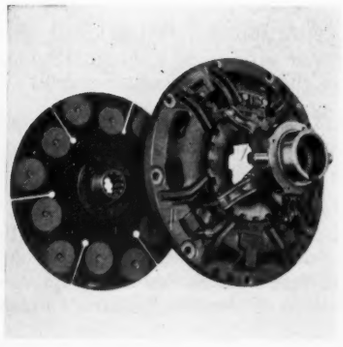
BIG, WELL-PROTECTED RADIATOR — Extra large, one-piece radiator provides all-weather cooling capacity. "Wrap-around" guard enables core to be mounted independently of guard for maximum strength and protection . . . and guard tilts forward for easy service accessibility.



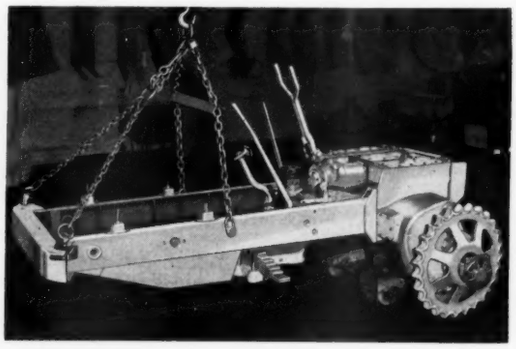
NEW ALLIS-CHALMERS DIESEL — This power plant is designed for big output, ample reserve capacity and low maintenance and long life. It delivers the goods by combining tornado turbulence and "follow-through" combustion, both *exclusive* in the HD-6 series.

STEP UP PERFORMANCE, CUT JOB COSTS WITH EXCLUSIVE HD-6 FEATURES LIKE THESE

- ★ Allis-Chalmers heavy-duty diesel engine — with "follow-through" combustion for long life, low upkeep.
- ★ 24-volt direct electric starting — for convenience and efficiency (standard equipment).
- ★ Wrap-around radiator guard for maximum strength and protection . . . tilts forward for easy service.
- ★ *Ceramic* master clutch lining — lengthens clutch life, reduces lever pull.
- ★ All-steel box-A main frame — protects the entire power train, makes possible superior balance . . . plus the service simplicity of unit construction.
- ★ One-piece steering clutch and final drive housing — for maximum strength, accurate bearing and gear alignment.
- ★ Double reduction final drives (straddle-mo on tapered roller bearings) provide max ground clearance.
- ★ Roller bearing truck wheels — with Positive that keep dirt and moisture out . . . grea
- ★ 1,000-Hour lubrication intervals for truck w idlers and support rollers.
- ★ Tru-Dimension tracks — with new standar strength and hardness *throughout* for extra ability.
- ★ Unit construction — major assemblies like e clutches and final drives can be removed w disturbing adjacent parts.
- ★ Engine-mounted bulldozers — for top dirt-m performance and extra tractor life.



EXTRA CLUTCH LIFE — WITH CERAMIC LINING — The HD-6 master clutch offers simple, single-plate overcenter design. Revolutionary new *ceramic* button clutch lining keeps clutch operating longer between adjustments . . . lengthens clutch life . . . reduces lever pull for easier operation.



STRENGTH AND PROTECTION — Here's one of the most important features of the new HD-6 tractors . . . an all-steel box-A main frame, *exclusive* in this size class. It protects the entire power train from shock loads, makes possible superior over-all balance and better equipment mounting . . . plus the service simplicity of unit construction. Major assemblies like engine and clutches can be easily removed without disturbing adjacent parts.

STRADDLE-MOUNTED FINAL DRIVE GEARS Tapered roller bearings support both ends of the final gear shafts. With smaller gears and shorter shafts (plus bored, one-piece case), that means better bearing and alignment, more strength, longer life . . . even with th load requirements of today's mounted equipment. the HD-6's exclusive *double-reduction* final drives pr greater ground clearance.

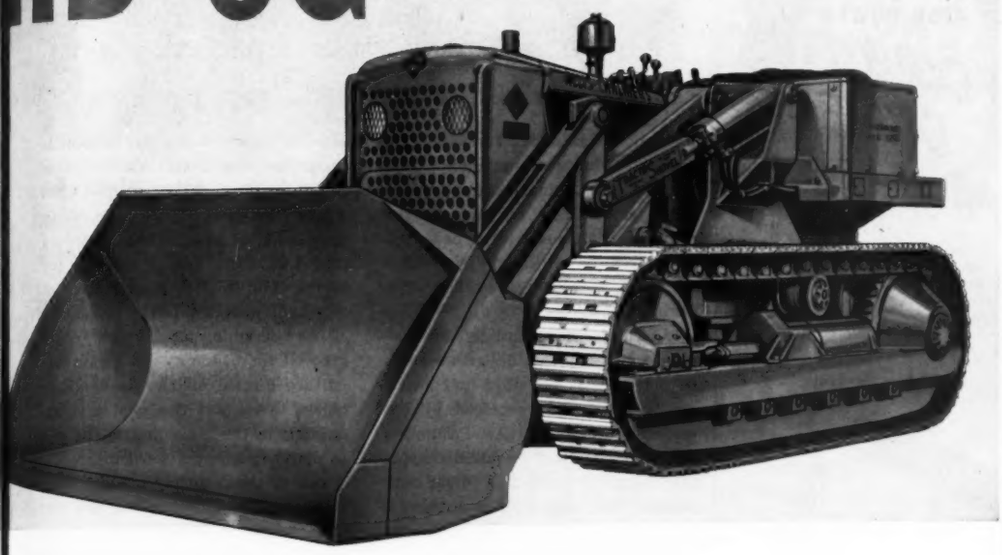
ALLIS-CHALMERS ANNOUNCES

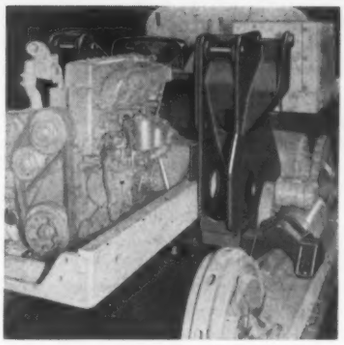
HD-6 SERIES TRACTORS

HD-6G

TRACTOR SHOVEL

Weight	19,600
Drawbar hp	45
Net engine hp	57
Bucket capacity	1-1/3 cu yd





HD-6G TRACTOR SHOVEL FEATURES — Here's the HD-6G shovel frame mounting assembly. The base of the side frame is mounted in the front to the tractor rigid beam, and at the rear to the truck frame. The upper part is bolted to a heavy steel "stabilizer" forming the cowl of the tractor. Together with the HD-6G's new hydraulic system, it provides greater strength, service simplicity and operator visibility. The HD-6G also offers a new two-position bucket, a two-speed reverse, and has extra long track, with six truck wheels on each side.

...PLUS TRACTOR SHOVEL FEATURES LIKE THESE...

- Extra long track (almost 7 ft on the ground) with six truck wheels per side — for real stability throughout the digging and loading cycle.
- New two-position bucket — for easy full-capacity loading in any material (standard equipment).
- Heavy-duty shovel assembly — built right into the tractor, not just an attachment.
- ★ Simple, safe hydraulic system — with no exposed hoses or fittings on cowl or deck.
- ★ Two-speed reverse, high foam-rubber seat and easy bucket control — for new tractor-operator efficiency.

FEATURES AVAILABLE *ONLY* IN HD-6 . . . no other tractor in this size class has them—all-steel main frame; one-piece steering clutch and final drive housing; double reduction final drives; welded steel truck frames; roller bearing truck wheels, idlers and support rollers; extra-heavy truck wheels and guards available; Tru-Dimension tracks; wrap-around radiator guards; engine-mounted bulldozers; heavy-duty Allis-Chalmers diesel engine with "follow-through" combustion; rubber engine mounting pads; ceramic button master clutch lining; unit construction; 1,000-hour lubrication intervals for truck wheels, idlers and support rollers; 24-volt direct electric starting (standard); crankcase guard (standard); bumper and lights (standard).

GET ALL THE FACTS NOW FROM YOUR NEARBY ALLIS-CHALMERS DEALER

Write now for more facts . . . or see your nearby Allis-Chalmers dealer

CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

ALLIS-CHALMERS
Construction Machinery Division
Milwaukee 1, Wisconsin

Please rush more information on the new HD-6.
- ☐ Bulldozer-Drawbar Tractor
- ☐ Tractor Shovel

Name .....

Title .....

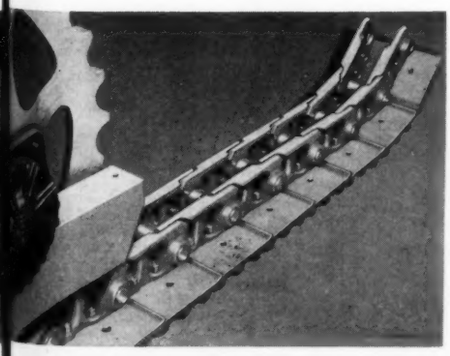
Company .....

Address .....

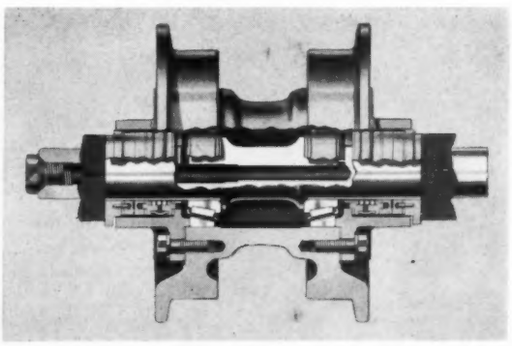
City .....

State .....

ALLIS-CHALMERS



-DESIGN, HEAVY-DUTY TRACK — The best ble methods in metallurgy and manufacturing are used duce HD-6 track that will provide long life under the st conditions. In addition to new over-all design, HD-6 s benefit from new heat-treating methods which make e new standards of strength and hardness *throughout* ra wearability. That assures maximum time on the job, eep costs.



SIMPLIFIED LUBRICATION — Truck wheels, idlers, support rollers need lubrication only once every 1,000 hours . . . because tapered roller bearings let Positive Seals work effectively to keep out dirt and moisture — hold lubricant in safely. Patented "flushing-type" lubrication cleans out old grease as it is replaced. No lube points under the tractor . . . no lubrication needed more often than every 75 hours. Go from one to two weeks without needing a grease gun.

For more facts, use Reader-Reply Card opposite page 18 and Circle No. 230

Data on rolling bearings

■ Literature featuring its new SCM line of ball-bearing pillow blocks and flange cartridge mounts has been announced by Dodge Mfg. Corp., Mishawaka, Ind. This bulletin also has up-to-date technical information and list prices on the complete line of Dodge SC ball bearings and Dodge-Timken roller bearings.

Data provided includes engineering drawings, dimensions, shaft sizes, weights, radial-load ratings and list prices.

The new line of SCM ball-bearing pillow blocks and flange cartridge mounts shown have been designed for medium-duty service. The seals used in these bearings have the same characteristics as those in the companion line — the SC bearings for normal duty. They are made of synthetic rubber with metal backing. They are so anchored mechanically that they cannot blow under grease-gun pressure.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 194.

Postonway pavement being put down on a runway project at Wilmington, N. C.

New system employs high-density ceramic blocks to provide wear-resistant, economical pavement

■ Vitrified ceramic blocks boasting high compressive strength, great density, and low volume change under wide temperature ranges are the principle components of a new type of pavement developed by Poston Brick & Concrete Products Co., Springfield, Ill.

Described as essentially an improved concrete-slab design in which 85 per cent of the sand and gravel commonly used is replaced by the ceramic blocks, the new Postonway pavement reduces required paving thicknesses by more than 50 per cent, permits easy low-cost maintenance and upkeep, and costs less than conventional concrete pavement.

The new pavement has been tested on both highway and airport runway projects. While providing an economical and efficient riding surface on highways, it is said to display even more dramatic qualities of durability on runways, especially at jet bases.

Applying the principle of reinforced brickwork to road construction, the Postonway system uses 8×8×4-inch ceramic blocks weighing 19 pounds each. The blocks are laid flat on a thin leveled sand bed, with ¾-inch spaces between them. Deformed ⅜-inch steel reinforcing bars are placed in these spaces between the blocks, and a free-flowing cement mortar is poured into the joints.

The ceramic blocks are edge-grooved for bonding, and lug-brackets are formed on the sides of the blocks to support the steel grid accurately in the lower half of the slab to obtain maximum tension.

One of the principle features cited by the manufacturer is the fact that water used in manufacturing these ceramic blocks is driven off during the drying process. The blocks are subsequently shrunk to eliminate cells and voids in the finished product. The effect of this process, according to the company, is to make the blocks virtually immune to moisture penetration.

For further information write to the company, or use the Request Card at page 18. Circle No. 88.

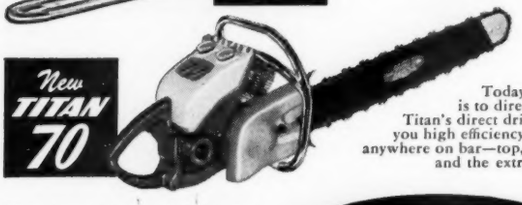
Cut Faster With... TITAN'S 2 Great New Saws

HIGH POWER DIRECT DRIVE

NEWEST FEATURES—SMOOTHEST CUTTING

New TITAN 30

Lightweight TITAN 30 with direct drive gives you full power—no transmission so no power loss! Famous BlueJet Chain gives smoother cutting. Trigger in pistol grip controls engine and automatically delivers constant oil flow to chain. Plunge Cut Bow also available.



New TITAN 70

Today's trend is to direct drive. Titan's direct drive gives you high efficiency cutting anywhere on bar—top, bottom and the extreme tip.

New direct drive TITAN 70 really goes after the big stuff! MOST POWER PER POUND. Easy starting. Newest automatic oiling system. Higher efficiency cutting anywhere on bar with famous BlueJet Chain. Get bigger timber faster with 22" to 44" bars. Does more work with less upkeep. See Titan in action today!

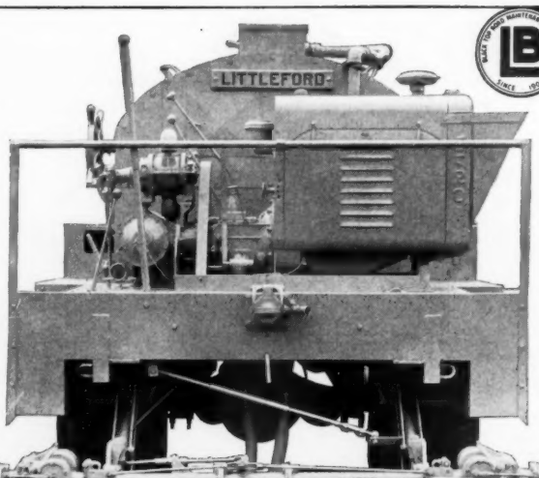
TITAN CHAIN SAWS

TITAN CHAIN SAWS, INC. • SEATTLE 4 • WASHINGTON

For more facts, use Reader-Reply Card opposite page 18 and Circle No. 231

LB LITTLEFORD

Littleford Bros., Inc.
485 E. Pearl St.,
Cincinnati 2, Ohio



Wide spray bar saves time and money. Shown here is Lite-Wate end folding full circulating bar, mechanical type . . . standard on Littleford SPRAY-MASTER Bituminous Distributor. Spray bars can be furnished up to 24-ft. wide.

Get the facts before you buy . . . send for bulletin BB-14.

Spray . . . faster . . . easier . . . and cheaper with Littleford "SPRAY MASTER" Bituminous Distributor

For more facts, use Reader-Reply Card opposite page 18 and Circle No. 232

ENGINEERED TO GIVE YOU MORE HEAT PER DOLLAR

The most economical portable oil burning heater on the market . . . for indoors or outdoors — keeps men and equipment working — construction materials usable. HY-LO will solve your heating problem. Operates on low cost fuel oil — will provide 70,000 to 140,000 BTU'S of clean heat per hour.

Dealer inquiries invited

Write or wire for nearest distributor

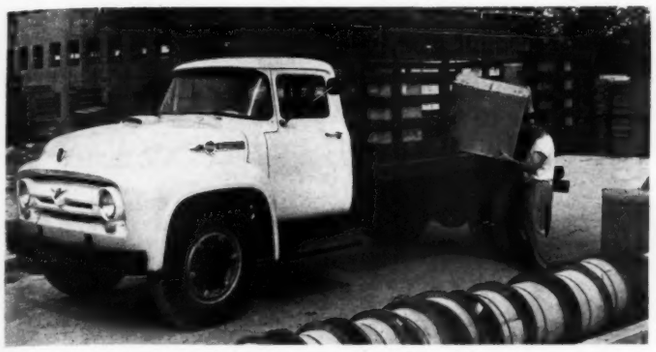
Distributors in all principal cities

INSIST ON HY-LO THE ONLY HEATER WITH THE OUTSIDE RETURN PIPE. COSTS NO MORE — THE CLEANEST BURNING, BEST PERFORMING HEATER YOU CAN BUY.

Schau PRODUCTS CO.
279 STOWELL
UPLAND, CALIFORNIA
WAREHOUSE: CHICAGO, ILLINOIS

For more facts, circle No. 233

New pickup and tandem-axle models head 1956 parade of Ford trucks; safety features are highlighted



The Ford F-750 Big Job is a heavy-duty tandem-axle model with 21,000-pound gross vehicle weight.

■ Two new models, a T-750 tandem-axle unit in the heavy truck series and a longer-wheelbase pickup, have been added to the Ford line of trucks. A total of 200 models ranging in gross vehicle weight from 5,000 pounds for the pickup to 42,000 pounds for heavy-duty tandem-axle units have been announced for the manufacturer's 1956 line.

Improved cab design in the new line features increased visibility of wrap-around windshields and optional wrap-around rear windows.

Two standard safety features—a safety steering wheel and safety door latches—are said to be new to the trucking industry. The safety steering wheel is designed with a rim 3 inches above the horn button to give the driver's chest added protection from the steering column in case of a crash. The safety door latch reduces the chance that doors will open in an accident, providing occupants added protection from being thrown out of the cab. Seat belts are optional.

Tubeless tires, standard equipment this year, reportedly increase Ford truck economy. According to the company, larger payloads can be carried because tubeless tires and wheels weigh less. They also are said to reduce tire-change time up to 70 per cent.

The Ford short-stroke low-friction engine design has been continued this year in eight engine combinations developed for more power, fuel savings, and durability. Horsepower has been increased in all engines, by 12.7 per cent in the smallest 223-cubic-inch 6-cylinder engine rated at 133 horsepower, to 17.6 per cent in the largest 332-cubic-inch heavy-duty Y-8 engine rated at 200 horsepower when equipped with a four barrel carburetor.

In the medium-heavy truck series, a special heavy-duty 168-hp Y-8 engine is available equipped with a four-barrel carburetor—one of the most powerful engines in this weight class. In the heavy truck series, an optional power package consists of four-barrel carburetion, dual exhausts, and special cold air intake. The intake is a hood airscoop, increasing efficiency and performance. The 332-cubic-inch engine develops 200 horsepower with this equipment.

In addition to wrap-around windshield design, styling advances include a new one-piece grille with integral head-lamp hoods and housings. The hooded roof extends ahead of the windshield, and acts as a partial sun visor. In the Customized cab, foam-rubber cushioning 5 inches deep in the seat and 3 inches deep in the seat back contribute to driver comfort.

All Ford cabs are available in a choice of eight single colors or eight two-tone color combinations.

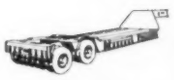
Power steering will be available this year as optional equipment on conventional heavy trucks. It is standard equipment on tandem models with 302 and 332-cubic-inch engines.

For further information write to the Ford Division of Ford Motor Co., P. O. Box 638, Dearborn, Mich., or use the Request Card that is bound in at page 18 of this issue. Circle No. 84.

NOW! "TRANSPORT" DETACHABLE GOOSENECK TRAILER

WORTHY TO CARRY THE TRADEMARK

TRANSPORT TT TRAILERS



MODEL MSO-D

Multiple axle drop bed semi, capacities 35 through 75 tons. Drop deck or flat bed.

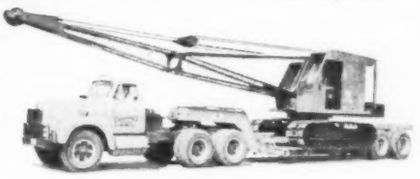
MODEL XTT

Tandem axle tilt trailer (tow type), capacities 13 through 20 tons.

DUMP TRAILERS

Single or tandem axle models. Standard capacities 8 through 15 yards.

MANY OTHER "TRANSPORT" MODELS



NEW MODEL GPRY

Tandem Axle Removable Gooseneck Trailer. Available as a beam trailer, flat or drop platform trailer, or as shown with removable side platforms with sliding outriggers.

"TRANSPORTATION ENGINEERING A SPECIALTY"

TRANSPORT TT INC. TRAILERS

CEDAR RAPIDS IOWA, U.S.A.

For more facts, use Reader-Reply Card opposite page 18 and Circle No. 234

...before it TALKS

...is the way our doctors put it—"Our chances of curing cancer are so much better when we have an opportunity to detect it *before it talks.*"

That's why we urge you to have periodic health check-ups that *always* include a thorough examination of the skin, mouth, lungs and rectum and, in women, the breasts and generative tract. Very often doctors can detect cancer in these areas long before the patient has noticed any symptoms.

For more life-saving facts phone the American Cancer Society office nearest you, or write to "Cancer"—in care of your local Post Office.

American Cancer Society

THE SIMPLICITY 40-TON, 3-COMPARTMENT FEEDER BIN

What more can be said about feeding an asphalt plant?

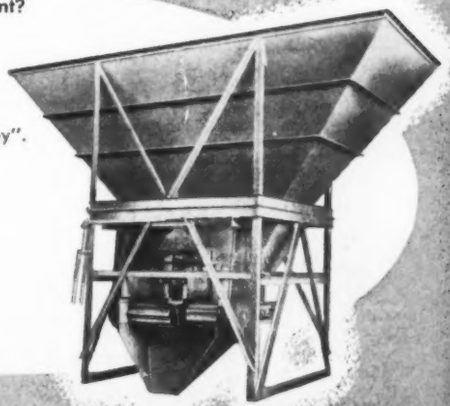
Crane operators say "it's an easy target to hit".

Feeder men say "don't have to hammer the sides or clean up around it".

Burner men say "steady feed keeps temperature right on the money".

Inspectors say "it splits gradation specifications right down the middle".

The Boss says "it's the most economical—in original cost, operating cost and maintenance cost"



THE SIMPLICITY SYSTEM COMPANY
DIV. OF WEST CONSTR. CO.

RIVERSIDE DRIVE • CHATTANOOGA 6, TENNESSEE
PHONES: 2-2144, 2-2145, 2-7667

AED regional conference considers current problems

Members at 4-region meeting in St. Louis, Mo., deal with today's selling in shirt sleeve sessions

Left to right, Jack R. Randle, field secretary, AED, St. Louis, Mo.; L. Miner Doolen, vice president and treasurer, Telford Equipment Co., East Lansing, Mich.; and N. O. Jones, general manager, Northwestern Equipment Co., Fargo, N. Dak.

This year, more than ever, the 4-region conference of regions 6, 7, 8, and 9 of Associated Equipment Distributors put emphasis on the economical and profitable operation of its midwestern dealerships. Held September 14 through 16 at the Chase Hotel in St. Louis, Mo., this third annual meeting really got rolling at the first session, September 15, with an opening address by the director of Region 9, G. L. Water of Missouri-Illinois Tractor & Equipment Co., Robertson, Mo.

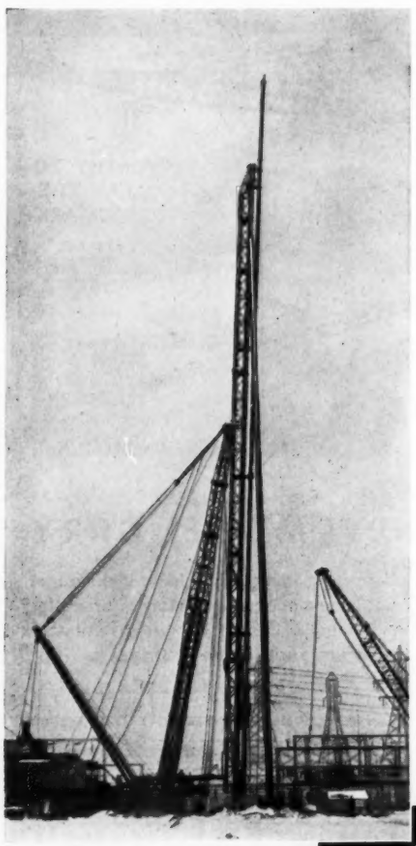
At this morning session, surveys of the immediate past, together with current pressing problems, were reviewed for members. R. J. Finn, AED president, briefed members on AED progress in 1955. A used-equipment survey was presented by AED executive vice president S. J. Laskey, and an address on the cost of doing business was given by L. Miner Doolen, vice president of AED. J. R. Randle, AED field secretary, spoke to members on sales planning.

Ross Shannon, formerly St. Louis district sales manager for Socony-Vacuum Oil Co., was the principal speaker at the luncheon following the opening session. John Lindner, Jr., of Bark River Culvert & Equipment Co., Eau Clare, Wis., and director of Region 7, served as toastmaster.

George W. Gagel, Machinery & Supplies Co., Kansas City, Mo.

The afternoon of this first day was given over to "shirt sleeve" sessions on used equipment, appraisals, reconditioning and junking of equipment, marketing, servicing, and financing.

These "shirt sleeve" sessions were continued at the morning session the next day—the closing day of the



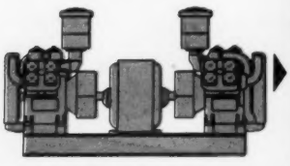
This pile driving and jetting rig, designed by Raymond engineers, is one of the tallest in existence, with a 112 ft boom and 220 ft jetting pipe which had to be equipped with an aircraft warning light.

1,000 horsepower of Air-Cooled Compressors help drive 200 FT. PILES

To get down to bed rock on a large power plant construction job, the Raymond Concrete Pile Company had to sink 24" steel pipes 180-ft long to a total depth of 200 ft. In order to start and drive these king-size piles, air and water jetting was first used to sink a 30" casing 50 ft down through the relatively soft overburden. The 180-ft pile pipes were then inserted in the casing, driven down to solid rock, cleaned out by jetting and filled with concrete.

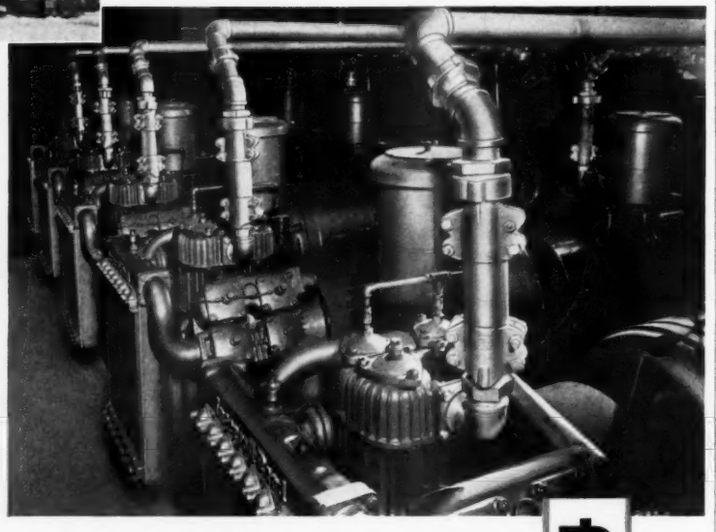
The large volumes of air needed for the jetting work were provided, at 100 psi, by ten Ingersoll-Rand Type 40 compressors, mounted back-to-back in pairs, each pair driven by a 200-hp motor as shown below. These compact, air-cooled two-stage compressors proved well suited to this type of construction work. They are easy to move and install, give wide flexibility of air capacity, require no water connections and can be used in the coldest weather without danger of freezing.

For dependable air power at lowest overall cost, it pays to specify Ingersoll-Rand compressors. They are available for handling air or gas at any pressure or capacity. Ask your I-R representative for further details.



Ten Ingersoll-Rand Type 40 two-stage compressors supplied 100 psi air for the jetting work on this 200-ft pile driving job. They are mounted back-to-back in pairs, with a 200-hp driving motor direct connected to each pair of compressors. These I-R units operated a total of 18,000 machine hours without a single breakdown.

Ingersoll-Rand air-cooled compressors are available in units of ¼ to 250 horsepower.



Ingersoll-Rand

I-269 11 BROADWAY, NEW YORK 4, N. Y.

COMPRESSORS • PUMPS • AIR AND ELECTRICAL TOOLS • VACUUM EQUIPMENT • ROCK DRILLS • CONDENSERS • GAS AND DIESEL ENGINES

For more facts, use Reader-Reply Card opposite page 18 and Circle No. 236

O. B. Avery, Jr., president of the O. B. Avery Co., St. Louis, Mo.

Frank J. Lorenz, partner, Lorenz Equipment Co., Columbus, Ohio.

meeting. Presiding over the closing session was the director of Region 6, Frank J. Lorenz of Lorenz Equipment Co., Columbus, Ohio. Just before adjournment, a question-and-answer period was held on various topics, with J. R. Clark, of White Star Machinery & Supply Co., Inc., Wichita, Kans., as moderator.

Glenn Walter, president, Missouri-Illinois Tractor Co., Robertson, Mo.

During the two-day-business session, a complete program, including sightseeing, entertainment, and a "get-acquainted" cocktail party was held for wives of members.

This year's meeting was handled by a four-man committee, one member representing each of the four regions. It included Lorenz, director of Region 6, (Ohio and Kentucky); Lindner, director of Region 7, (Illinois, Indiana, Michigan and Wisconsin); John R. Borchert of Borchert-Ingersoll, Inc.,

Larry R. Durrell, vice president, Service Equipment Co., Kansas City, Mo.

St. Paul, Minn., director of Region 8, (North and South Dakota and Minnesota) and Walter, director of Region 9, (Iowa, Kansas, Missouri, and Nebraska).

Prior to the meeting the convention committee for the annual AED meeting January 29 to February 2, 1956, met with chairman W. A. Patterson of Richards Equipment Co., Waco, Texas, to make preliminary arrangements for the convention. President Ray Finn and executive secretary P. D. Hermann were among the 12 committee members planning the meeting, which is expected to draw more members than the record-breaking 3,000 that met last year.

THE END

This department is devoted to the activities of equipment distributors. We shall be glad to receive information of new appointments, changes in personnel, the construction of new plants, etc.

Three new Marion dealers

Distributors handling the line of shovels, cranes, draglines, and related equipment manufactured by Marion Power Shovel Co., Marion, Ohio, have been appointed in North and South Carolina and Colorado.

Southern Machinery Co., Inc., P. O. Box 1701 Durham, will cover North Carolina. In South Carolina, the dealer is B. L. Montague Co., E. Liberty St., Sumter. The dealer in Colorado, Western Machinery Co., 2400 W. 7th Ave., Denver, has a branch office in Grand Junction, Colo.

(Continued on page 44)

Check 'Em!

ONLY ADAMS Motor Graders have all these time and money-saving advantages

8 Forward Speeds
✓ Provide the "right" speed for every operation and a higher travel speed. Save time—reduce costs.

4 Reverse Speeds
✓ Up to 13 mph. . . . Save valuable production time backing on short stretches, between forms, etc.

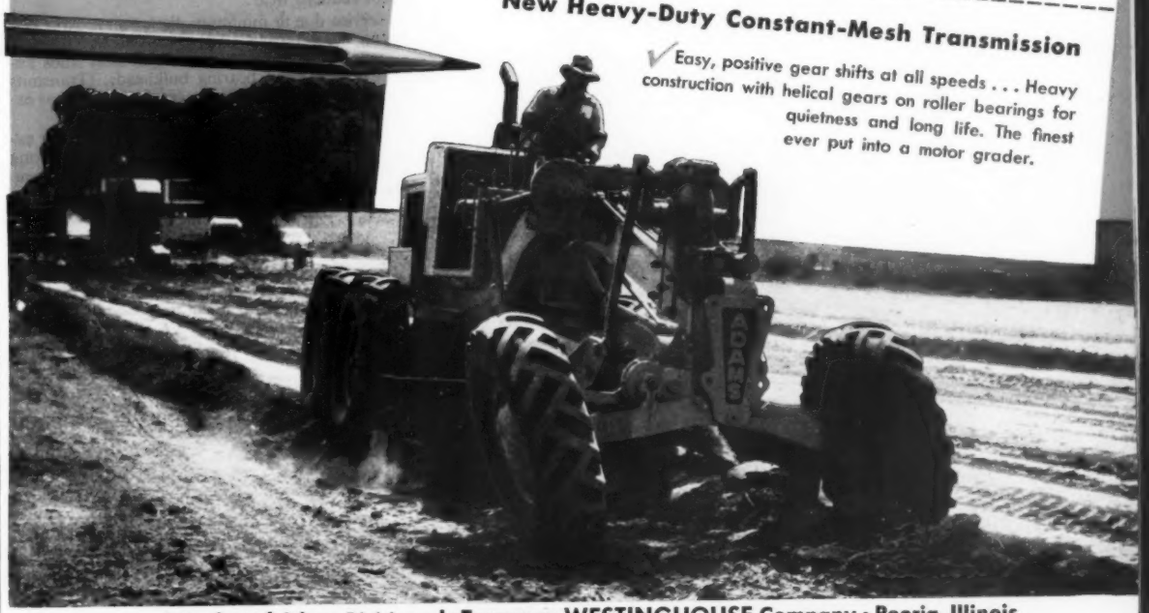
3 "Creeper" Speeds
✓ ¼ to 1¾ mph. (optional). Use full engine power while gearing grader to slow-speed operation.

Rubber-Mounted Engine
✓ Floating power—no engine vibration transmitted to grader. Increases operator efficiency.

Dual Braking System
✓ Service brake applies hydraulic braking action to transmission as well as wheels. Quicker, safer stops.

Foot Accelerator
✓ Permits operator to drive grader as naturally as truck or automobile. Safer handling in traffic.

New Heavy-Duty Constant-Mesh Transmission
✓ Easy, positive gear shifts at all speeds . . . Heavy construction with helical gears on roller bearings for quietness and long life. The finest ever put into a motor grader.



A Product of Adams Division • LeTourneau-WESTINGHOUSE Company • Peoria, Illinois
Subsidiary of Westinghouse Air Brake Company

Make your next motor grader an ADAMS

For more facts, circle No. 237→

NAMES IN THE NEWS

Concrete Industry Board re-elects R. H. Corbetta

The president of Corbetta Construction Co., New York, N. Y., Roger H. Corbetta, has been re-elected chairman of the Concrete Industry Board, Inc., of New York City. Mr. Corbetta will serve his fifth term in office.

Also re-elected were William J. McIntosh, secretary, and Dugald J. Cameron, treasurer. Eleven members of the board of directors were elected.

M. L. Dickinson elected president of engineers club

The Engineers Club of Los Angeles has elected Maurice L. Dickinson president of the organization. Mr. Dickinson, chief hydraulic engineer of Bechtel Corp., San Francisco, Calif., is in charge of the construction of hydroelectric projects.

Other officers elected are: L. W. Chasteen, valuation engineer for Union Oil Co., vice president; Robert F. Stewart, sales manager of Western Precipitation Corp., secretary; and Wallace W. Kenney, sales engineer of Graybar Electric Co., treasurer. Six directors were also elected.

C. M. Kelley joins National Lime Assn.

The National Lime Association has employed Conard M. Kelley to provide technical information and service to highway engineers on the lime stabilization of road bases and subbases.

Kelley, formerly with the 4th Army Headquarters, supervised the construction and reconstruction of lime stabilized roads in military bases and camps in the Southwest. For the past 16 years he has been with the Texas Highway Department, the last two of which he supervised the laboratory testing of lime-soil mixtures. His temporary headquarters is at Gatland, Texas.

John P. Riley appointed officer of Ibec Housing

The new vice president and chief engineer of the Ibec Housing Corp., New York, N. Y., an affiliate of the International Basic Economy Corp., is John P. Riley, a director of the American Society of Civil Engineers. Presently the director of development for the New York City Housing Authority, Mr. Riley will retain that post until his new appointment becomes effective on January 1.

John P. Riley, who will take office as vice president and chief engineer of Ibec Housing Corp., on Jan. 1.

He has also served as coordinator of school construction for the Board of Education of New York City, as a civil engineer on the Projects Installation Committee of the Air Force, and as field engineer on the original studies and survey for the Pennsylvania Turnpike.

Minnesota department names chief engineer

L. P. Zimmerman, former highway engineer for Hennepin County, has been made chief engineer for the Minnesota Department of Highways, St. Paul, Minn.

The former district engineer for the department, A. O. Torgerson, has been appointed assistant commissioner of highways, taking the place left vacant by the resignation of O. L. Kipp. Kipp has been retained as a consultant for the department.

Chief engineer named for Pennsylvania Highways

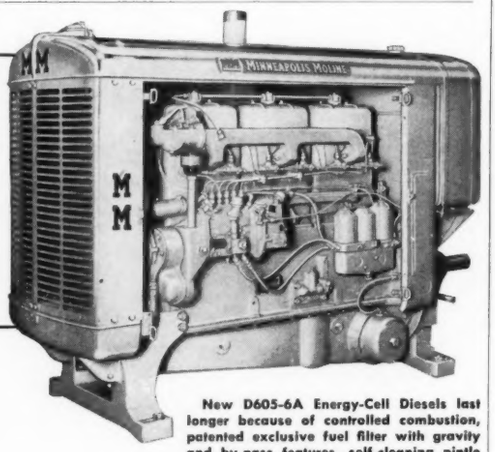
All technical programs of the Pennsylvania Department of Highways, including design, maintenance, construction, and reconstruction of highways and bridges has been placed under the direction of Arthur L. Wiesenberger, the newly appointed chief engineer of the department.

A civil engineering graduate of Cornell University, Wiesenberger is a registered professional engineer and since March of this year has served as engineer in charge of District 5.

WHY IT PAYS TO OWN INDUSTRIAL DIESELS WITH REMOVABLE CYLINDER BLOCKS AND HEADS

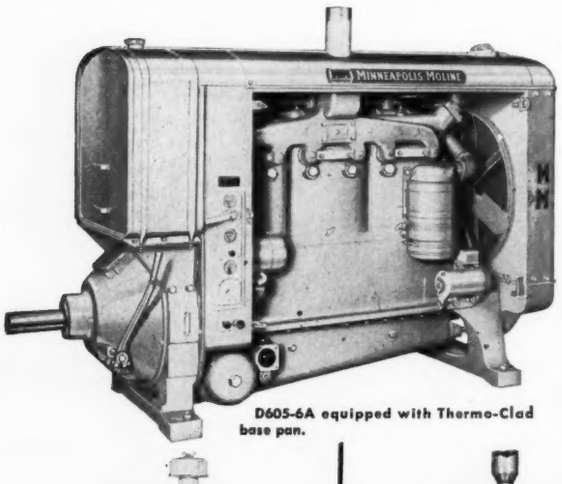
New MM diesels were developed with *energy-cells* to make them last longer, do more and go farther with less down-time and maintenance.

To provide owners with lower cost maintenance when necessary MM diesels are the most advanced and soundly engineered because the cylinder blocks are cast in pairs separate from the crankcase.



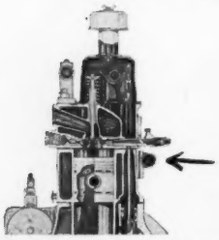
New D605-6A Energy-Cell Diesels last longer because of controlled combustion, patented exclusive fuel filter with gravity and by-pass features, self-cleaning pintle type nozzle, directed cooling of area around combustion chambers.

YOU GET THESE ADDED ADVANTAGES . . .

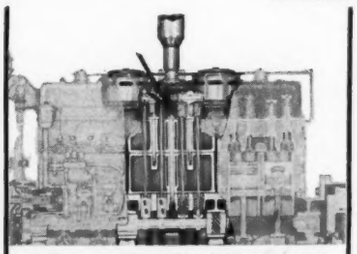


D605-6A equipped with Thermo-Clad base pan.

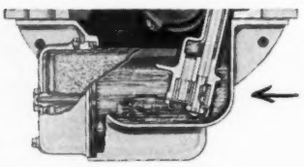
1. Ease of maintenance and low cost emergency service because paired cylinder blocks, pistons, and rods can be removed as a unit by one man.
2. Prolonged time between overhauls by use of close-grain cast iron that provides best cylinder lubrication for reduced wear.
3. Less service due to minimum distortion as MM cylinder heads, cylinder blocks and crankcase are virtually strapped together by full-length steel studs anchored in the main bearing bulkheads. (Transmits combustion pressure to heavy crankcase that has extra depth below center line of crankshaft.)
4. Efficient operation obtained by uniform cylinder expansion . . . the result of controlled cooling and long oil-cooled cylinder wall skirts below ring travel area.
5. "New engine" performance at extremely nominal cost can be obtained right in the field without special tools using factory matched cylinder blocks, pistons, pins, and rings. (Blocks are dowelled to crankcase to assure bore is square with crankshaft and pistons are precision fit to bore . . . equivalent to a factory job.)
6. Lower initial cost stems from high production parts by casting cylinder blocks in pairs separate from the crankcase.



1. Cylinder head and block assembly shows coolant entrance at hottest point first and extra long skirt wall construction.



2. Close-up of how MM cylinder heads and blocks and crankcase are tied into a single rigid unit with long studs.



3. A D283 feature is extra large oil filter enclosed in base pan, floating-screen oil pump intake, and pump located in bottom of base pan.

Optional Thermo-clad water-blanketed base pans for all units also have oil filter included to give more effective filtering.

INDUSTRIAL MM MINNEAPOLIS-MOLINE MODERN MACHINERY DIVISION

MINNEAPOLIS-MOLINE

MINNEAPOLIS 1, MINNESOTA

For more facts, use Reader-Reply Card opposite page 18 and Circle No. 238

Keith M. Saville, recently appointed field engineer for the Calcium Chloride Institute.

Calcium Chloride Institute names field engineer

The Calcium Chloride Institute, Washington, D. C., has appointed Keith M. Saville field engineer for the eastern coastal states. From his headquarters in Washington, D. C., he will service the area from northern Virginia to New England.

Mr. Saville was formerly an instructor for the U. S. Army Corps of Engineers at Fort Belvoir, Va., and materials engineer for the District of Columbia Department of Highways.

A. I. Savin, recently elected director of Merritt-Chapman & Scott Corp.

M-C&S elects three to board of directors

Three vacancies on the board of directors of Merritt-Chapman & Scott Corp., New York, N. Y., have been filled with the election of A. I. Savin, Marshal G. Staub, and Carl McFarlin, Sr.

Savin is the founder of the Savin Construction Corp., East Hartford, Conn., and the Whaling City Dredge & Dock Corp., Groton, Conn., both recently-acquired M-C&S subsidiaries.

Executive vice president in charge of the M-C&S chemical, paint, and metallurgical division, McFarlin is also president and a director of Tennessee Products & Chemical Corp., of Nashville, Tenn., and Devoe & Raynolds Co., Inc., Louisville, Ky., which were acquired by M-C&S this year through an exchange of shares. Staub, treasurer of the firm, holds executive positions with eight M-C&S subsidiaries.

For more facts, circle No. 239→

E. R. Needles is elected president of ASCE

The American Society of Civil Engineers has elected Enoch R. Needles president to succeed William Roy Glidden. Mr. Needles, the senior partner of Howard, Needles, Tammen & Bergendoff, of New York, was installed at the society's national convention in New York. He will serve for one year.

Newly elected vice presidents to serve two years are Frank A. Marston and Glenn W. Holcomb.

Carey H. Brown, Clarence E. Eckel, Mason C. Prichard, John P. Riley, R. Robinson Rowe, Louis E. Rydell, and Robert H. Sherlock, newly installed directors, will serve three-year terms.

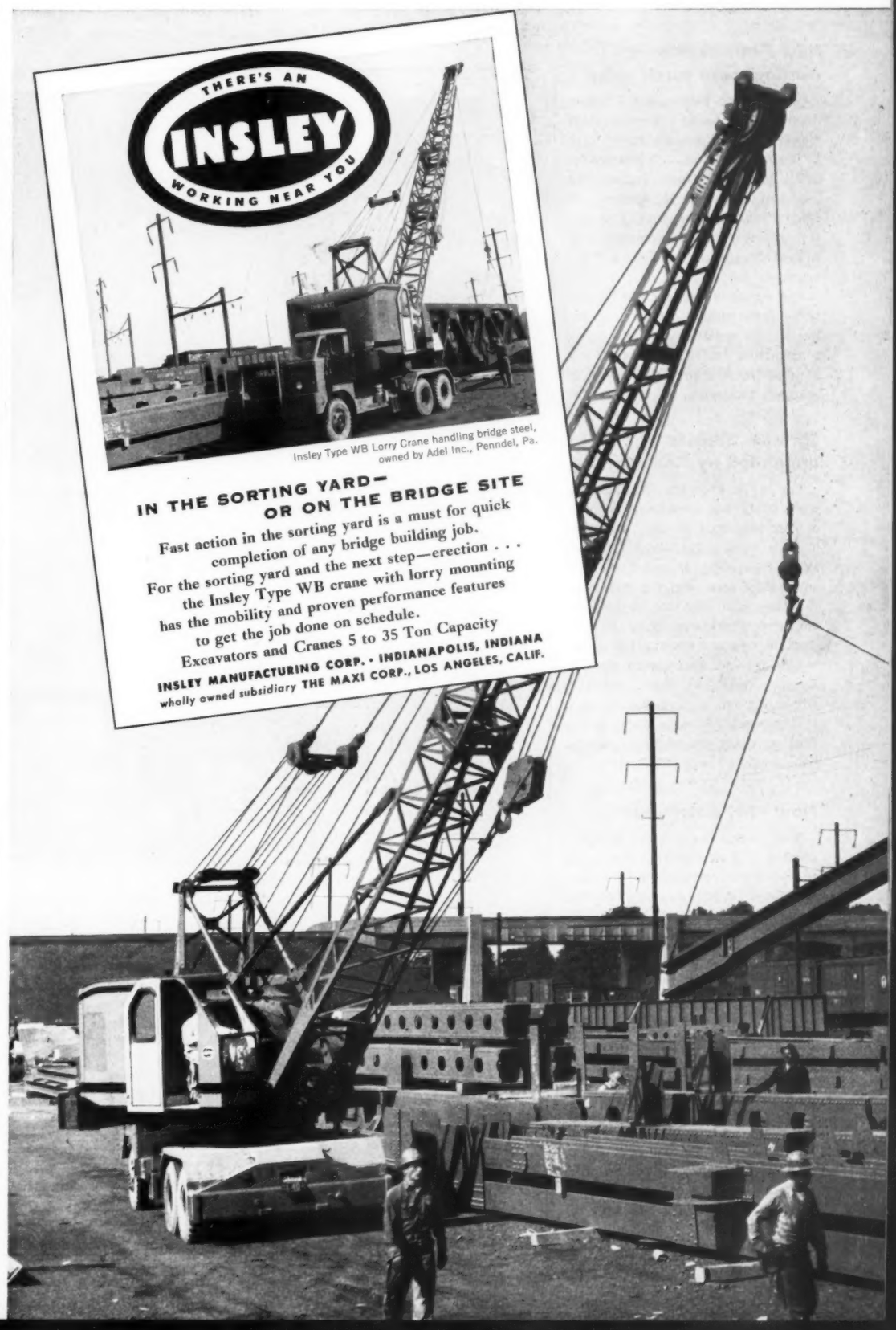
H. A. Scribner directs publicity for road show

The American Road Builders' Association has appointed Harvey A. Scribner chairman of the publicity committee of its 1957 road show. Scribner, president of Russell T. Gray, Inc., industrial advertising agency of Chicago, Ill., held the same post in 1948.

The road show will be held at the International Amphitheatre in Chicago, January 28 through February 2, 1957.

H. K. Ferguson to handle Addressograph expansion

The H. K. Ferguson Co., designers and builders from Cleveland, Ohio, will handle the major portion of the expansion of Addressograph-Multigraph Corp.'s manufacturing and office facilities in Cleveland. The contract, in excess of $4 million, includes design and construction of a factory addition, a new office building with enlarged research facilities, and a boiler-plant expansion.


THERE'S AN
INSLEY
WORKING NEAR YOU
Insley Type WB Lorry Crane handling bridge steel, owned by Adel Inc., Penndel, Pa.
IN THE SORTING YARD—
OR ON THE BRIDGE SITE
Fast action in the sorting yard is a must for quick completion of any bridge building job.
For the sorting yard and the next step—erection . . . the Insley Type WB crane with lorry mounting has the mobility and proven performance features to get the job done on schedule.
Excavators and Cranes 5 to 35 Ton Capacity
INSLEY MANUFACTURING CORP. • INDIANAPOLIS, INDIANA
wholly owned subsidiary THE MAXI CORP., LOS ANGELES, CALIF.

(Continued from page 41)

John L. Fremon, president of Garlinghouse, Fremon & Co.

New firm takes over Garlinghouse retail sales

Garlinghouse, Fremon & Co., a new firm, has purchased the retail sales division of Garlinghouse Bros., 2415 E. Washington Blvd., Los Angeles 21, Calif. John L. Fremon, former vice president and general manager of State Equipment Co., Albany, N. Y., is president of the new company, and A. F. Garlinghouse is chairman of the board.

The company will operate temporarily at the same address, representing all the nationally known heavy construction machinery previously handled by Garlinghouse Bros. in southern California.

Six new dealers appointed by Anderson Co.

The W. H. Anderson Co., Inc., Detroit, Mich., has appointed six dealers in Michigan to sell American Tractor Corp.'s TerraTracs. Throop Farm Equipment, Grand Blanc will cover Flint area, and the Bay City-Saginaw area will be serviced by Northern Equipment Sales of Bay City. In Oakland County, the dealer is Blackett, Inc., Farmington. Norman Dupuie TerraTrac Sales, Lakeville will cover the Oxford-Romeo area. P. Comperchio Tractor Sales is the Jackson dealer. Raymond G. Knapp will handle Monroe City.

New P&H distributor

H. C. Ormes Construction & Equipment Co. is now serving the entire southern half of Minnesota for Harnischfeger Corp., Milwaukee, Wis. The firm, located at 5600 Wayzata Blvd., Minneapolis, will provide sales and service for all P&H models from the 8-ton capacity Miti-Mite truck-crane to the 2½-cubic-yard power shovel.

Madsen works appoints new distributor in South

Madsen Works, Construction Equipment Division, Baldwin-Lima-Hamilton Corp., La Mirada, Calif., has appointed R. S. Armstrong & Bros. Co., Atlanta, distributor of Madsen products in the state of Georgia. From headquarters at 676 Marietta St. N. W., Armstrong will handle both sales and parts service of asphalt plants and asphalt-plant equipment.

Anderson Co. establishes new equipment firm

A new company, the Fair-Way Equipment Co., has been organized by the W. H. Anderson Co., 47 W. Seven Mile Road, Detroit, Mich., to handle sales of Thew-Lorain equipment and parts. The new firm will maintain offices at the Anderson address.

Allis-Chalmers news

Stoddard Electric, Orofino, Idaho, has been named a motor distributor by Allis-Chalmers Mfg. Co., Milwaukee, Wis. The franchise covers five counties in the state. The Allis-Chalmers line carried by Empire State Equipment Co., 36–38 Randall St., Providence, R. I., was expanded to include motors and generators. The dealer covers the entire state of Rhode Island.

The Berks Engineering Co., Sixth and Chestnut Sts., Reading, Pa., has been certified as a service shop for A-C motors and controls. This firm serves a six-county territory.

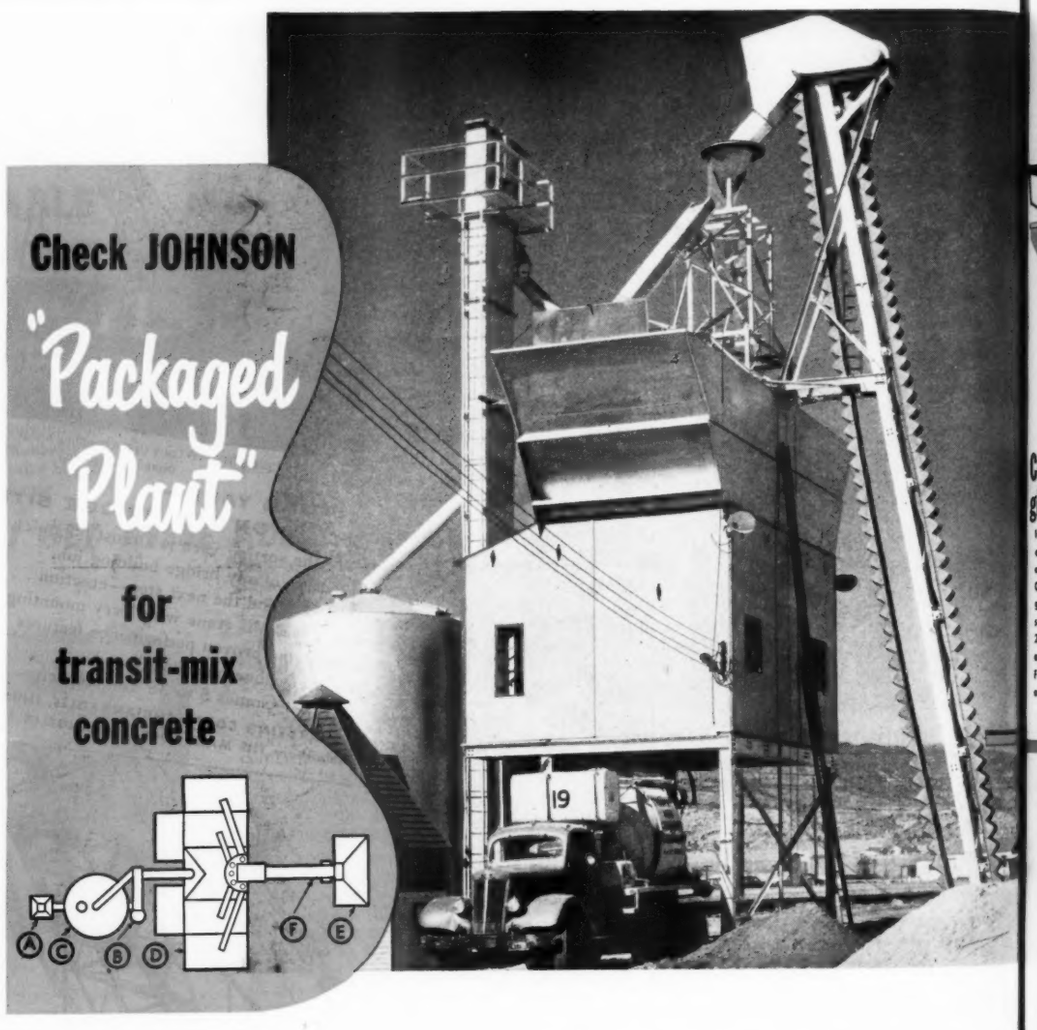
Warner & Swasey adds three distributors

The Warner & Swasey Co., Cleveland, Ohio, has appointed three new distributors for the multi-purpose Gradall.

Western Traction Co., 2230 Third St., San Franciso, Calif., will cover the northern part of the state, including Fresno, Sacramento, and San Francisco. The eastern half of Kansas and the western part of Missouri will be serviced by Funkhouser Machinery Co., 2424 Jefferson St., Kansas City, Mo.; and Road Machinery & Supplies Co., 210-212 E. First St., Duluth, will cover the state of Minnesota.

Huber-Warco appoints new southern distributor

Huber-Warco Co., Marion, Ohio, has appointed Mitchell Distributing Co., Spruce Pine, N. C., as distributor of Huber's complete line of tandem rollers, three-wheel rollers, and graders. From its headquarters in Spruce Pine, and branch office at 5405 Hillsboro St. Extension, Raleigh, Mitchell will cover the entire state of North Carolina.



Specially developed for low-cost production of transit-mix concrete, this plant is a typical example of Johnson "complete-package" engineering. Plant is fully Johnson-equipped. Every function, from receiving and storage of materials to final weigh-out, is carefully coordinated for fast, accurate operation. Here's how it works:

Truck-receiving hopper (A) feeds cement into a screw conveyor, which carries the cement to enclosed bucket elevator (B). 275-bbl.-per-hour elevator fills an all-welded, 520-bbl. storage silo (C), or directs the flow of cement as needed into central compartment of plant bin (D). Aggregates are received at truck-unloading hopper (E). An open, inclined elevator (F) feeds the aggregates into a pivoted distributor, mounted at top of bin. Johnson welded tandem bin provides total overhead storage capacity of 110 cu. yds. for immediate plant use. Bin consists of four 19-yd. aggregate compartments, and a centrally-located, 250-bbl. cement compartment. On batcher floor, below bin, 2 cu. yd. Concentric Aggregate-Cement Batcher, and a Johnson water batcher accurately weigh out materials, and discharge into transit-mix trucks.

For any transit-mix, central-mix or concrete products operation, large or small, it will pay you to check the efficiency of Johnson plants and accessory equipment. See your Johnson distributor soon, or write us.

C.S. JOHNSON COMPANY

CHAMPAIGN, ILLINOIS • (Koehring Subsidiary)

CJ334

JOHNSON KOEHRING PRODUCT

BINS • BATCHERS • RECEIVING HOPPERS • SILOS • ELEVATORS • ELEVATING CHAR

Heil names two dealers

The Heil Co., Milwaukee, Wis., has added two more distributors to its roster. Rivers Body Factory, P. O. Box 11146, Tampa, Fla., will handle Heil truck bodies and hydraulic hoists in 13 counties of the state, and Irvin F. Nelis Associates, Houston, Texas, will distribute the company's line of bodies and hoists, elevating tailgate units, and related products in southeastern Texas.

Prime-Mover appoints two new distributors

Prime-Mover Co., Muscatine, Iowa, manufacturer of powered carts, has appointed Anderson Equipment Co., Pittsburgh, Pa., its distributor for western Pennsylvania. Tri-State Equipment Co., Memphis, Tenn., will service western Tennessee, northern Mississippi, and eastern Arkansas.

Wright Power Saw names four new distributors

Wright Power Saw & Tool Division of Thomas Industries, Inc., Louisville, Ky., has added four new distributors of gasoline-powered saws. In New England, R. E. Jarvis, Brookline, will cover Massachusetts, Connecticut, and Rhode Island; while Northern Power Equipment Co., Yarmouth, Mass., will service New Hampshire, Vermont, and Maine.

Port Huron Co., Kansas City, Mo., will handle northwestern Missouri, Kansas, and northern Oklahoma; and Port Huron Machinery & Supply Co., Lincoln, will cover the entire state of Nebraska.

Text on highway financing

The report of the Financial and Administrative Research Branch of the Bureau of Public Roads, "The Financing of Highways by County and Local Rural Governments, 1942–51", presents detailed statistical data on county and local receipts, expenditures, and debt for rural highways and city streets. Information for each year is included by states.

Most of the data was obtained from the local road-finance reports prepared by state highway department planning survey organizations. Other information was estimated by the Washington staff of the Bureau of Public Roads on the basis of published reports of local finances, state highway department reports, and other sources.

The report is a sequel to the first study, "The Financing of Highways by Counties and Local Rural Governments, 1931–41", published in 1949.

Copies of the 110-page report may be obtained for 75 cents from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

New film shows methods of mining for nickel

A new 45-minute, sound-color film, "Mining for Nickel", outlines the history of nickel mining in the Sudbury area of Canada and details six mining methods. Parts of the film are animated to demonstrate the fundamental principles of mining engineering and to illustrate economic mining methods.

Educational, industrial, and civic groups may obtain the movie from its producer, the International Nickel Co., Inc., 67 Wall St., New York 5, N. Y., or from the Douglas D. Rothacker, Jr., Organization, 729 Seventh Avenue, New York, N. Y.

Text of NSPE conference on professional development

The complete transcript of the last conference of the National Society of Professional Engineers has been published in booklet form under the title, "Professional Development—The Responsibility of Industry and the Engineer".

The 56-page booklet covers the entire proceedings from the opening of the sessions by Clarence T. Shoch, retiring president, to the featured talks, panel discussions, and to a final question-and-answer period.

Some of the topics discussed were the development and utilization of engineers in industry, the nation's need for engineer-industry cooperation, and the role of engineering education in engineer-industry cooperation.

Single copies are available at $4 from the National Society of Professional Engineers, 1121 15th St. N. W., Washington 5, D. C.

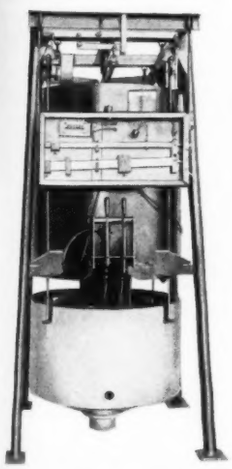
Symposium to be held on government contract law

The School of Law, Fordham University, and the Empire State Chapter of the Federal Bar Association will hold a symposium on "Some Practical Aspects of Government Construction Contract Law." The meeting will be in Keating Hall at Fordham University on December 2 and 3, 1955. Attorneys in government service and in private practice will speak on specific topics relating to the performance of lump sum and unit-price government construction contracts.

Further details may be obtained by writing to Fordham Federal Bar Association Institute, 302 Broadway, New York 7, N. Y.

Concentric Batcher gives central cement feed

In this exclusive Johnson Concentric Batcher, aggregates are arranged concentrically around cement . . . prevents "gumming". Cement is weighed on separate scale; aggregates are weighed on accumulative dial scale, or on individual beam scales. Sizes: 2 to 6 cu. yds., can be arranged for 2 to 8 aggregates, plus 1 to 4 types of cement. Fully automatic, air-ram operated . . . or semi-automatic . . . or manual controls.



Johnson Water Batcher

increases mix plant efficiency . . . gives close quality control of concrete. Accuracy is not affected by changes in water temperature. Capacities: 120-gal. (1,000 lbs.) for batches up to 3 yds., and 240-gal. (2,000 lbs.) for batches up to 6 yds. Either semi- or fully-automatic types available.

CJ334

HILL, CONCRETE BUCKETS

New features on Kwik-Mix 16-S Dandie®

Latest 16-S Dandie concrete mixer, interchangeable side or end discharge, has adjustable double-contact skip shaker, automatic water system, 3-point suspension mounting on heavy coil springs, cast steel drum heads with machined roller paths. Also, exclusive remixing action, and 8-second discharge with tilted Flow-Line Chute. Other models: 3½-S, 6-S, 11-S . . . bituminous, plaster-mortar mixers, power wheelbarrows.

KWIK-MIX • Milwaukee, Wis.
(Koehring Subsidiary)

14½-ft. per-min. Parsons Trenchmobile®

Rubber-tired Trenchmobile drives job-to-job at 12.6 m.p.h. . . . digs 8 to 16 in. wide, 5 ft. deep, up to 14½ ft. per min. Sloping ladder boom makes vertical set-ins, undercuts sidewalks, curbs, old mains. Other features: hinged crumber, "Tap-In" digging teeth, reversible conveyor, optional backfill blade. Also ask your Parsons distributor about the 2 wheel-type and 3 ladder-type Trenchliners® . . . all full crawler mounted.

PARSONS Co. • Newton, Iowa
(Koehring Subsidiary)

More work-time with Koehring Dumptor®

With more than a ton of strength for every ton of payload capacity, Koehring 6-yard Dumptor withstands severest loading shocks. Sides, end and double-strength bottom are heavily rib-reinforced. Stationary or free-swinging kick-out pan adds another ½" steel plate to heavy-duty bottom. Gravity dump eliminates body hoist maintenance. 1-second dumping speeds haul cycles. Also check Dumptor fast no-turn shuttle hauling.

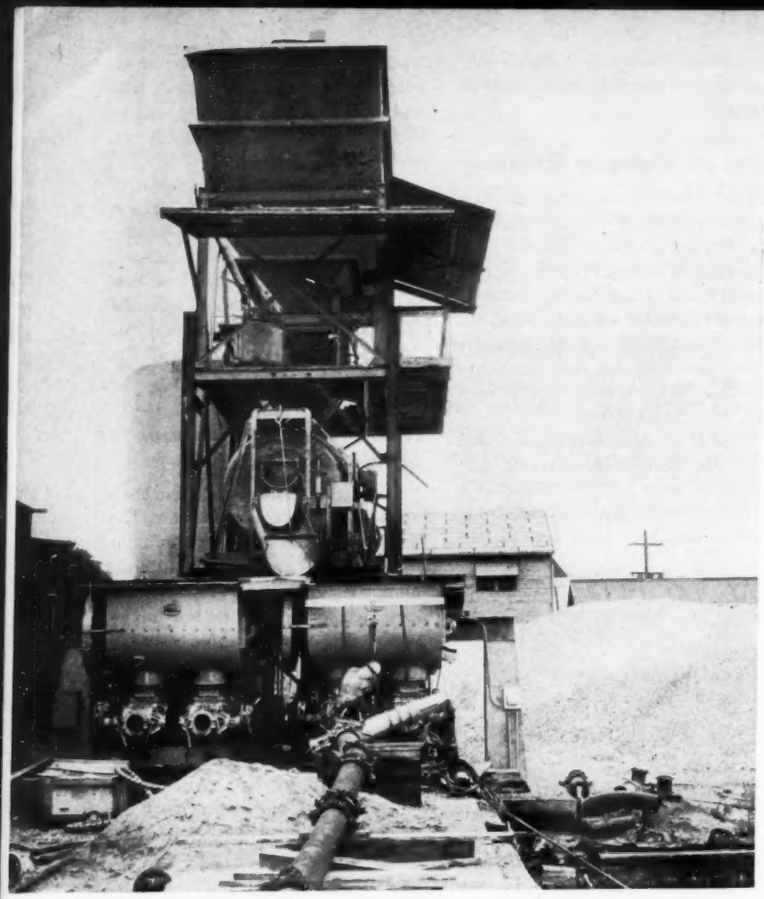
KOEHRING Company
Milwaukee 16, Wis.

Z65

For more facts, use Reader-Reply Card opposite page 18 and circle No. 240

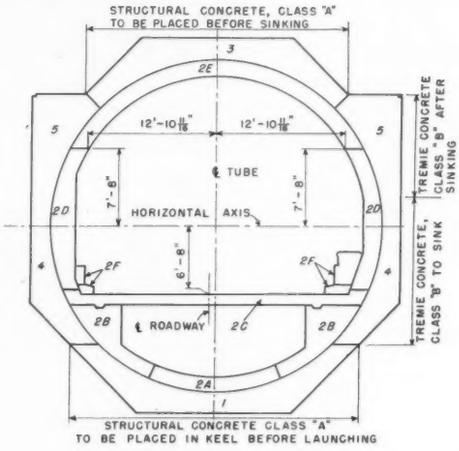
Hampton Roads crossi

Section is sunk every two weeks for 6,859-foot trench-type tunnel; 1,650,000 yards of fill builds up islands connecting tunnel and bridges



Supplying about 55 yards of concrete per hour for tunnel lining is this plant, consisting of Blaw-Knox aggregate bins, a Worthington 2-yard mixer, an Erie elevator with 400-barrel silo, and two Rex Model 200 4-yard pumps for the Pumpcrete system.

C&E Staff Photo

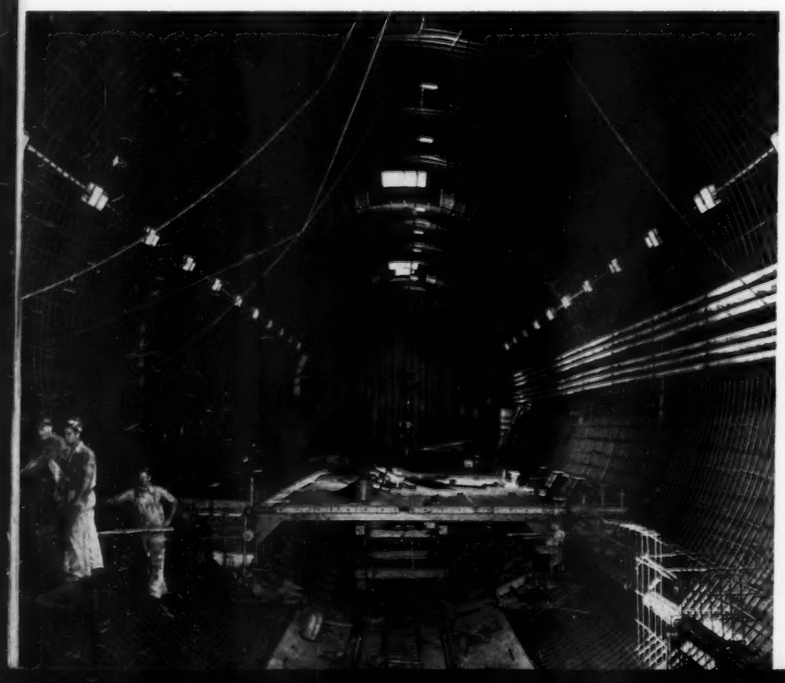


This cross-section of the octagonal outer wall and the inner circular shell shows the sequence of concrete placing before, during, and after the sinking of the tube.

The tunnel section of the Hampton Roads tunnel and bridge crossing is being constructed on a tight schedule, with a 300-foot-long shell being sunk into place in a prepared trench beneath the Roads every two weeks. Keeping to this schedule—which means working on four tube sections at once at the Lamberts Point yard at the foot of 38th St. in Norfolk, Merritt-Chapman & Scott, New York, N. Y., expects to have the 44-week-long job finished well before the project completion date next October.

Two artificial islands in the Roads, consisting of 1,650,000 cubic yards of hydraulic fill, have already been built up to provide an intermediary stage at either end of the 6,859-foot-long tunnel. These islands will carry tunnel traffic to the 3,250-foot-long north trestle and the 6,510-foot-long south trestle.

The first of the 23 double-shelled tunnel sections, fabricated under a $4,500,000 subcontract by Baldwin-Lima-Hamilton Corp., Eddystone, Pa., was side-launched last May into the Delaware River at Eddystone for the



Blaw-Knox forms for a haunch section are supported on a traveler that rides on rails laid over the concrete. This same section of form and traveler will be used for the 14-inch roadway slab.

In the foreground, the invert and haunch sections have already been placed. Another 37½-foot section of tunnel is being formed in the rear. Concrete is placed through pipes reaching up to the roof of the tube.

ossin-a multiphase job

by ANTHONY N. MAVROUDIS, field editor

Fabrication of 23 tunnel sections, each 300 feet long, is being done under a subcontract by Baldwin-Lima-Hamilton Corp., at the firm's Eddystone, Pa., plant. The section at the right is ready to be side-launched into the Delaware River for towing to Hampton Roads.

Sidewall forms are stripped after an arch pour and the traveler is moved ahead. Special Blaw-Knox forms score the sidewalls to provide a better bond between the concrete surface and the tile overlay.

trip to the project site.

Like the other sections, this had a circular inner shell 33 feet in diameter and an outer octagonal-shaped shell 37 feet across flats. Before the section left Eddystone, the reinforcing steel for the interior concrete lining was installed, and a keel pour made between the inner and outer shells to provide the tube with stability in the water. Two steel bulkheads, one on each end of the 300-foot-long section, kept the tube watertight during the trip and while it was sunk into place at Hampton Roads.

Leaving Eddystone, the first tube was towed via the Delaware, Delaware-Chesapeake Canal, Chesapeake Bay, and Elizabeth River to a "shape-up" site at Lamberts Point near Norfolk, about 5 miles from the project site.

Concrete poured in five stages

Arriving at the "shape-up" point, the tube was anchored to the contractor's pier, where an American diesel electric locomotive crane handled the lifting and lowering of the Blaw-Knox forms into the tube during concreting operations on the roadway, air ducts, sidewalls, and other tunnel facilities.

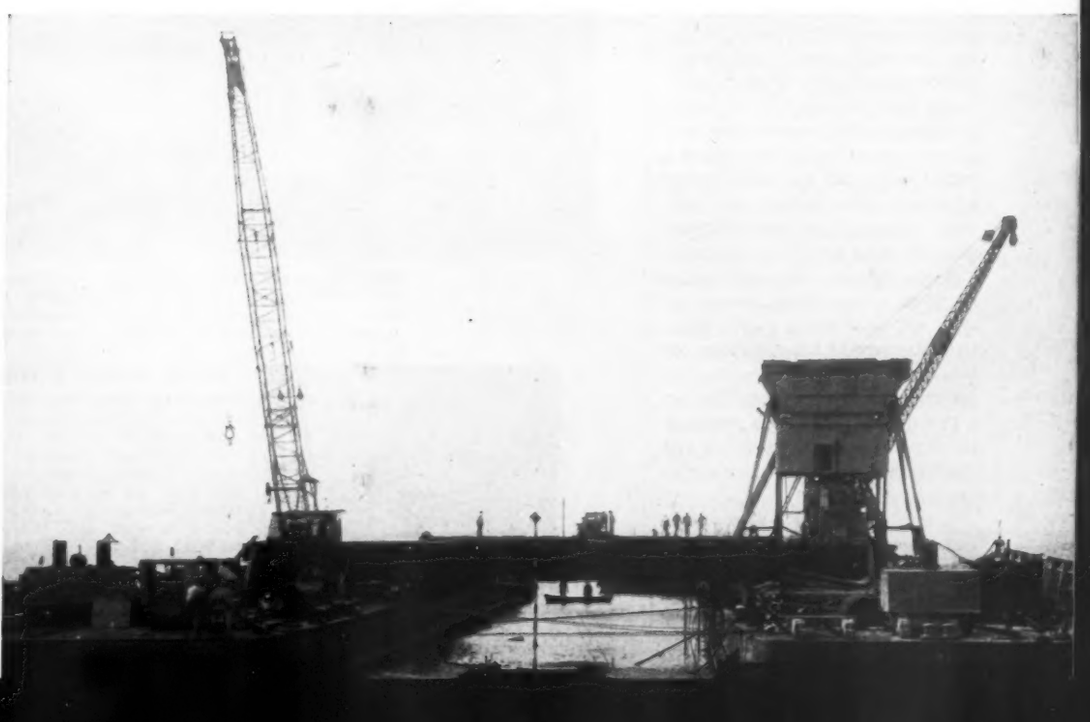
Concrete for this interior work was brought to crews by the Pumpcrete method from a Blaw-Knox batching plant set up on the land side of the pier. Adjacent to the plant is the aggregate stockpile of stone at 1 inch and ¾ inch, and sand, both supplied by Southern Materials Co., Inc., Norfolk. Aggregate is delivered by barge and unloaded and stockpiled by a Manitowoc 2000 Speedcrane with a clamshell. Bulk cement, delivered to a rail siding at the plant, is picked up by an Erie elevator for storage in a 400-barrel cement silo.

While the hopper is being charged by the Manitowoc crane, aggregate and cement are weighed by a beam scale and dumped into a Worthington twin-drum 2-cubic-yard mixer. After a 2-minute mixing cycle, concrete is released into one of two Rex Model 200 4-yard pumps. Each is driven by a Waukesha gasoline engine and has 6-inch Siamese outlets feeding approximately 55 cubic yards per hour to the floating section.

The important factor of maintaining the stability of the floating shells while concreting is done—a standing problem on long sections such as this—is being solved by pouring the 18-inch lining at the quarter points simultaneously. The lining is being poured in five stages. First an invert section of approximately 60 degrees is poured. This is followed by a pour to form the sidewalls of the lower or fresh-air duct. The 23-foot roadway is done in a third pour, side walls of the vehicular passage in the fourth, and the arch of the passage in the fifth and final pour. Each completed 300-foot section, if weighed in air, would come to about 12,000 tons—570 tons of it structural steel and 11,430 tons of it built-in concrete.

A special design feature of the two 150-foot sets of Blaw-Knox forms imparts a horizontally scored surface to the tunnel sidewalls so they may be tiled easily. This scoring is obtained by properly spaced wires welded to the faces of the sidewall form panels. Special screw-type stripping jacks

(*Continued on next page*)



Spotted in precise location between two barges tied together with steel girders, the first section is supported by tackle as it sinks from the weight of the concrete. As it goes down, transit readings are taken on the tower masts at each end of the tube.

A Marion 372 crane places riprap on the north portal island with a clamshell bucket. A bedding course of 1½-inch gravel, placed 1½-feet thick along the side slopes of the island, will be covered with rock weighing up to 1,800 pounds each.

C&E Staff Photo

(Continued from preceding page)

break the bond between the scoring wires and the hardened concrete.

Sinking tube in position

By mid-July the first section was ready to be set in place. Weighed down with concrete, the section approached negative buoyancy and was towed out into Hampton Roads and maneuvered into position between two barges moored directly above the 50-foot-deep and 40-foot-wide trench prepared for it. This first section was sunk immediately adjacent to the north portal island—3,250 feet from the Hampton shore. By means of two tower masts, one on either end of the floating tube, the tube was aligned by transits set up in survey towers at either end of the underwater route. Adjustments in alignment were made by taking up or slacking off on the barges' anchor lines and the load blocks.

With the tube section finally in position, approximately 240 tons of concrete, mixed on one of the barges, was pumped through tremie pipes into compartments between the inner and outer shells. This additional weight caused the tube to sink.

It went down gently, supported by a specially designed lowering tackle which rested on the barges and was attached to plate shackles built into the top of the section. As the section was lowered, engineers maintained transit sights on the masts to make sure it was in alignment. After reaching bottom on the previously prepared screeded gravel trench, the southern end of the section was about 50 feet below the water surface, and additional readings were taken to determine the exact grade and alignment. Concrete pumping was continued to fill up the compartments between the inner and outer shells, until a negative buoyancy of approximately 600 tons was reached. Following this operation, sand was pumped through a pipe to firmly embed the section in the trench, keeping the southern end clear so that it could be connected to the next section.

Backfilling calls for a 5-foot minimum cover over the concrete envelope of the tube, with a 1½-foot underwater gravel blanket wherever the existing bottom is less than 5 feet above the tube. An underwater gravel berm, approximately 3 feet higher than the gravel blanket, will be placed at the top of the dredged slope of the trench wherever this slope is less than 5 feet above the envelope concrete of the tube. It is estimated that approximately 60,000 cubic yards of gravel will be required for underwater gravel berms and blankets, while 22,600 cubic yards will be needed for the 2-foot foundation course of the trench. The remaining 22 tube sections are being sunk in exactly the same way as the first, and each is being pinned to the previous section by divers required to work at depths varying from 50 to 120 feet below the surface.

Once the second section was sunk and joined to the first, an earth dike was built across the first section and the dammed area of the portal island's southern tip was filled with hydraulic fill. This permitted construction of a joint between the first underwater section and the island's cut-and-cover approach and this in turn permitted the removal of the section's north bulkhead. As soon as several sections have been sunk and joined, the exterior joints between the cans will be sealed by a tremie concrete envelope poured around the tube between adjacent bulkheads connected by steel sheet forms.

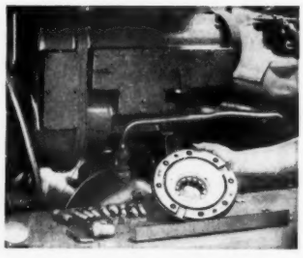
After all 23 sections have been placed and backfilled, the bulkheads will be removed and the joints sealed again from the inside.

Tunnel portals on islands

While the first tube sections were

Good news for construction men . . .

BUILT FOR THE BIG JOBS! You just can't beat the new 600′ Blue Brute for day-in, day-out air power. It's built to last, too, with two-stage oil separator, separate air and oil tanks. And low-set, easy-to-fill fuel tanks, shorter wheel base make it easier and safer to use on the job.



New Rotor Design!

QUICK, EASY INSPECTION. For example, an unskilled mechanic can replace a rotor blade in a jiffy if need be — right in the field! Photos tell how-to story of speedy blade removal. (1) Take out machine bolts and remove bearing cap . . . with needle bearing in place. Then end plate is removed without disturbing inner-bearing race on rotor shaft. (2) Rotor blades removed for inspection or replacement. That's all there is to it.

being sunk into place, pumping of hydraulic fill for the portal islands was rapidly approaching completion. The entire job of pumping the 1,650,000 cubic yards of fill was completed in August by the Barlow, a hydraulic dredge owned and operated by the Atlantic Gulf & Pacific Co., New York, N. Y. This firm, together with Norfolk Dredging Co., Norfolk, and the Great Lakes Dredge & Dock Co., Chicago, made up the Atlantic Contracting Corp., the joint-venture firm awarded the dredging subcontract.

This contract included dredging and backfilling of the trench for the underwater tunnel, dredging for a relocated channel on the Hampton side, and the building of the two man-made islands. Both islands were completely filled, then later redredged to allow tube 1 and tube 23 to be sunk.

In building the north portal island, the Barlow placed about 260,000 cubic yards of hydraulic fill obtained from the dredging of the channel. The existing bottom, about five feet below mean sea level, consisted of a satisfactory type of sandy material, and fill was placed directly on it until an elevation of plus 11 above mean sea level was reached. Starting at the far end of the proposed island, the dredge pumped fill until the desired elevation was obtained, cut off a section of the discharge, and repeated the procedure until the opposite end of the island was reached. The fill for the north island was placed in one continuous lift.

Unfortunately, the area underlying the south island had an unsatisfactory material, consisting mostly of river mud and silt that went approximately 90 feet deep. This material, totaling more than one million cubic yards, was removed to a depth of 104 feet, the upper 50 feet by means of a dipper dredge and the remainder by means of the clamshell dredge Atlantic. The excavated material was loaded onto barges and towed 20 miles into the open sea, where it was dumped. All this excavation meant that a total of 1,500,000 cubic yards of fill had to be placed for an island with a surface elevation of plus 11 feet, a width of 500 feet from toe to toe, and a length of about 1,730 feet.

Aside from the huge amount of fill required, the job of building up the south island was complicated by the fact that the area is practically surrounded by state-owned and privately-operated oyster beds, and great care had to be exercised to make sure silt was not deposited over them.

The contractor placed silt traps throughout the beds and kept a constant check on the amount of silt—if any—that was deposited. For this reason the Barlow started placing fill this past June, 3,300 feet away from the northern tip of the south island. The 27-inch discharge line, half floating and half submerged, had a discharge outlet about 40 feet above the excavated trench. As soon as a 16 to 20-foot lift was placed at the northern tip of the island, the outlet was moved south for an adjacent 16 to 20-foot lift.

This method was used for the total length of the island. When the southern limit of the island was reached, a section was removed from the vertical outlet and moved back to the northern tip to repeat this process for another 16 to 20-foot lift. While these lifts were being placed for the 115-foot fill, the Barlow kept moving eastward, away from the oyster beds. Approximately 6,000 feet of discharge pipe, with about 4,000 feet of it submerged, was strung out before the island was completed in August. Another job in this area was that of pumping fill to connect the south portal island to an existing island known as Fort Wool—an abandoned military installation—to prevent the portal island from eroding in the strong currents which flowed through this gap.

Discharge and suction lines

The discharge line, leaving the Barlow at the center line between the two 34-inch diameter spuds, consisted of 38-foot lengths of 27-inch pipe connected with flexible ball joints. This feature allowed the dredge to dig with either spud down. Each length of floating pipe was supported on two 52-inch-diameter cylinders with cone ends. The cylinders were tied together with 12 × 12 strongbacks.

As the dredge was stepped forward 12 to 14 feet at a time by each 66-foot-long spud, it made an average of two passes per 6-foot cut. The two 100-foot-long swing booms allowed an average lateral pass 200 feet wide for the 32-inch suction line. The dredge was generally stepped forward when the vacuum reading in the control room went down to 8 inches. A vacuum of 20 inches was maintained for normal digging, and the maximum allowed was 30 inches. As the readings increased on the vacuum gage (indicating a larger volume of material being pumped) the ladder was raised in order that a shallow cut could be obtained and the vacuum dropped to a normal operating 20 inches. The reverse process was used when the vacuum pressure began dropping. The maximum depth the ladder attains is 56 feet.

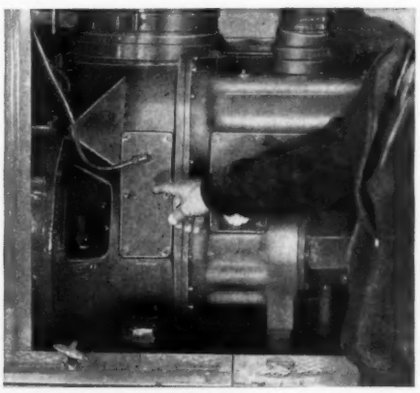
Hung from the 84-foot ladder is the 6-foot-diameter cutterhead and the 32-inch suction line, capable of handling gravel up to 20 inches. An Elliot 800-hp electric motor, mounted on the trunnion end of the ladder, turns the

(Continued on next page)

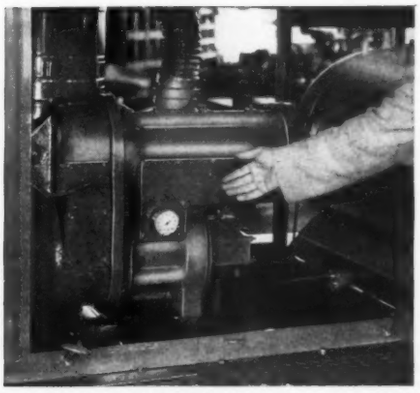
the 600′ Blue Brute Rotary is ready now!

And it's got all the features that made the 315′ Blue Brute a hit with contractors everywhere — features that add up to the easiest to use, most *practical* rotary ever built!

New clutch! New cylinder arrangement!



EASY-ACTING RELIABLE CLUTCH that lets you warm up the engine before you cut in the compressor. Result: there's less wear and tear; you get quick starts *all* the time. And symmetrical clutch also assures vibration-less operation at all speeds.



SELF-DRAINING COMPRESSOR eliminates settling of oil, moisture in low area of cylinder, inter-stage chamber or discharge point. Unique cylinder arrangement gravity-drains *all* oil and moisture during shutdown. No accumulation damages blades on cold starts.

See the new 600′ Blue Brute Rotary now at your local Worthington distributor's. Or write for bulletins to Worthington Corporation, Portable Compressor and Contractors' Tool Division, Section H.4.19, Harrison, New Jersey. H.4.19

WORTHINGTON

IF IT'S A CONSTRUCTION JOB, IT'S A *Blue Brute* JOB

ROCK DRILLS • WAGON DRILLS • PAVERS • CONCRETE MIXERS • PORTABLE PUMPS

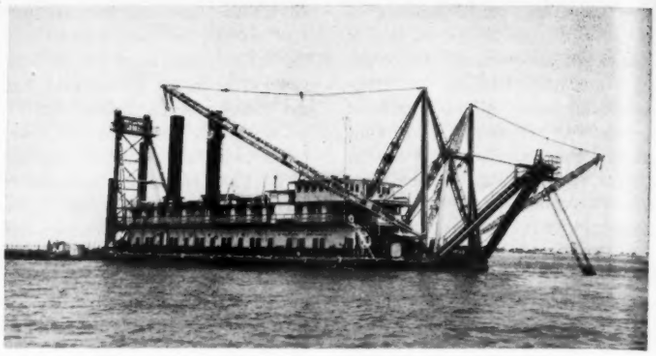
For more facts, use Reader-Reply Card oppcsite page 18 and Circle No. 241

(Continued from preceding page)

cutterhead through a reduction gear at 31 rpm.

Dredge well equipped

The Barlow, measuring 184 feet long by 44 feet across the beam, averaged about 27,000 cubic yards every 24 hours, with 90 men working three 8-hour shifts. Relatively new, the Barlow has had improvements added since it was built eight years ago by the Ellicott Machine Corp., Baltimore, Md. The swing booms, originally 80 feet long, have been lengthened to 100 feet to allow wider passes. The crew's quarters, sleeping 60 men, have been air conditioned by a Carrier 25-ton unit since June, 1954. When the dredge was built, duct work for air conditioning was installed, and this substantially reduced costs when the Carrier unit was added. A Sperry gyrocompass, installed in the modern control room, assists in determining the limits of a pass as well as in normal navigation.



The Barlow, a 184 x 44-foot dredge which pumped hydraulic fill for both islands, has 100-foot swing booms, enabling it to make a 200-foot pass for each 6-foot cut. The dredge has a 32-inch suction line and 27-inch discharge.

C&E Staff Photo

Some of the original control-room equipment includes air-operated control levers, a gage indicating the depth of ladder, another gage registering spud heights, and the vacuum gage. In the captain's office is a ship-to-shore RCA Model ET-8012-C telephone with a frequency range of 2,000 to 3,000 kilocycles.

Riprap for portal islands

As soon as the Barlow completed the north portal island, M-C&S lost no time in hauling riprap out and placing it to protect the islands' side slopes against waves, tides, and currents. Finished slopes are 2½ to 1 above water, and 4 to 1 below water level until an elevation of minus 5 is reached, where the slope fans out to 10 to 1.

The riprap bedding course, 1½ feet thick, consists of 1½-inch gravel placed from the top of the island, from elevation plus 11 to a point 5 feet below mean sea level. The 3-foot-thick riprap course is made up of broken rock with maximum weights of 1,800 pounds and minimum weights of 250 pounds. This course extends from a point not below elevation plus 7 to 5 feet below mean sea level.

An estimated total of 32,000 cubic yards of riprap had to be purchased at Bryant Rock & Sand Co.'s. Neverson quarry and shipped by rail to Norfolk where a Manitowoc 3000-B Speedcrane transferred it onto barges for shipment to the portal islands. Another Manitowoc crane on the north island equipped with an orange-peel bucket literally picked the huge pieces one by one from the barge and loaded them into end-dump trucks. These shuttled across the island and dumped their loads over the edge of the side slopes while a Marion 372 with a clamshell assisted in distributing the riprap uniformly. An International TD-18 tractor spread the hydraulic fill over the island to obtain a level surface exactly 11 feet above mean sea level.

Last work on tunnel

With the islands built, and tunnel sections being sunk on schedule, the big job of finishing the tunnel remains. This includes installation of the ceramic sidewall tiling, porcelainized-metal hung ceiling, fluorescent lighting, and a 4-inch bituminous-concrete wearing surface for the roadway.

Because of the length of the tunnel, it will be necessary to use a transverse system of ventilation. Fresh air will be taken in through louvers in the ventilation buildings, which will be built above the cut-and-cover sections of the islands and supplied by fans to the duct space under the tunnel roadway. From here it will be forced into the tunnel through flues situated

DRILLING COSTS CUT IN HALF with this JOY TRAC-DRILL

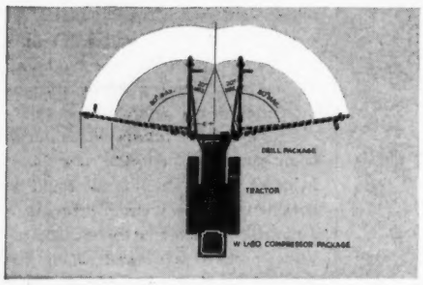
56%, TO BE EXACT was this contractor's reduction in drilling costs on his Missouri highway job, with the Joy Trac-Drill.

"STAY AHEAD OF THE SHOVELS," was the order. But *four* wagon drills driven by *two* compressors couldn't do it. Even with overtime . . . a long ten-hour day . . . the seven-man crew (four drillers, two helpers, one compressor operator) couldn't meet production.

A JOY TRAC-DRILL PACKAGE was mounted on a used tractor along with a Joy WL-80 Compressor Package. (Joy furnished complete instructions.) The rig worked like a charm. It easily led the shovels . . . and with only *four* men—two drillers, one helper and a tractor operator. The unit was completely self-contained and maneuverable. The B-I-G savings show up in the contractor's weekly cost figures:

	4 WAGON DRILLS	JOY TRAC-DRILL
Labor	$ 810	$500
Depreciation (3-yr.)	212	145
Fuel	140	86
Total	$1160	$730
Performance (week)	7200 ft.	10,200 ft.
Cost—foot of hole	16¢	7¢

THE TRAC-DRILL PACKAGE INCLUDES twin drills and feeds mounted on Joy Hydro Drill Jibs (hydraulically-actuated booms with power lift and power swing). Because the jibs are extensible, the Trac-Drill can reach out to put many holes in a straight line, if necessary, from one tractor setup. A used tractor, past its prime can thus be converted to an ace drilling machine. The whole story is in our Bulletin M-214, free for the asking. Just write ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario*



Each Hydro Drill Jib on the Joy TRAC-DRILL operates in a 100° arc making it possible with extensible 10' jibs to drill to a 42' width.

Consult a Joy Engineer

for AIR COMPRESSORS • ROCK DRILLS • WAGON DRILLS
CORE DRILLS • BLAST HOLE DRILLS • PORTABLE HOISTS • FANS
BLOWERS • TUNNEL, QUARRY, MINE EQUIPMENT

JOY W&D C5469

CONSTRUCTION EQUIPMENT MANUFACTURERS FOR OVER HALF A CENTURY

For more facts, use Reader-Reply Card opposite page 18 and circle No. 242

along the side at uniform spacing. Vitiated gaseous air in the tunnel will be exhausted through openings in the ceiling to the exhaust air duct. Then it will be drawn through the exhaust fans in the ventilation buildings to openings in the roof. Each building will supply fresh air and exhaust gaseous air for only half the tunnel length.

A departure from the usual tunnel-ventilation system will be the use of axial-flow fans. Although these fans have not been used for tunnel ventilation in this country, they have been used succesfully in mine operation where they have proved superior to centrifugal fans. The initial cost of axial flow fans compares favorably with that of centrifugal fans and, because they will be installed directly in the air duct from the tunnel, the size of the ventilation buildings can be reduced. Each building will contain four supply and four exhaust fans, each having a maximum capacity of 213,000 cfm. Maximum ventilating capacity will be used only in emergencies; the average demands will be approximately 10 per cent of maximum.

Catch basins spaced along the roadway curbs will collect water from washing operations and water tracked in by vehicles, and carry it through a pipe system to a sump at the low point of the tunnel. This sump will contain settling basins, and automatic drainage pumps which will pump the collected drainage to a sump in the north ventilation building. From here the water will be pumped into the open waters of Hampton Roads.

An auxiliary pump at the low point of the tunnel will remove any water which may collect in the fresh-air duct below the roadway, discharging it into the sump at the low point of the tunnel. Generally speaking, all storm water will enter the portal sumps and be discharged into Hampton Roads by the portal pumps.

Water for fire protection and for domestic use in the ventilation buildings will be supplied from the cities of Norfolk and Hampton through 8 and 10-inch water mains carried over the approach bridges and into the buildings. An 8-inch main will also be extended through the tunnel and connected to the supply systems in each ventilation building. Installed fire pumps will raise the pressure of the water to conform with fire-protection requirements.

All electric power will be furnished by the Virginia Electric & Power Co. from two substations, one at Willoughby Spit, Norfolk, and one at the Hampton shore. This arrangement provides two independent sources of power, reducing the possibility of power interruptions. Tunnel lighting will consist of a continuous fluorescent system installed on each side of the roadway, with lights on one side powered by the north ventilation building and lights on the other powered by the south ventilation building.

The open approaches, providing a transition from bridge to tunnel on the portal islands, will be lighted by 20,000 lumen mercury-vapor lamps mounted on the parapet of the open approach walls.

Coordinating job

Two converted Pullman cars at Lamberts Point serve as mobile offices for project manager Robert I. Senn and his staff. The project manager's setup has quarters for the office manager and bookkeeper, adjoining bedroom and bath, supply room, receptionist-secretary's office, and ladies lounge. The other car houses offices for the project engineer, J. Yeary, his assistants, purchasing agent, chief timekeeper, plus a file room and lavatory. Both rolling offices were brought to Lamberts Point from Savannah, Ga., where M-C&S completed construction of the Eugene Talmadge Memorial Bridge, a high-level crossing over the Savannah River.

Crews are being transported to various points throughout the project by crew boats powered by General Motors 200-hp diesels. Three tugs, powered with similar diesels, are kept busy towing barges of materials on the Roads. Project manager R. I. Senn visits the job in a crash boat, coordinating work by means of the Bendix radio system on all floating equipment. THE END

Portable lube units

■ Literature on its portable lubricating equipment for contractors' use is available from The Aro Equipment Corp., Bryan, Ohio. A typical lubricating unit is pictured, and diagrams detailing the mounting of three, four, and five-reel lubricating setups on truck beds are included. Pumps, reels, hose, control valves, fittings, and other accessories are described individually in extensive lists.

To obtain this literature write to the company, or use the Request Card that is bound in at page 18. Circle no. 76.

NOW!
AMERICAN EXPANDS CRANE-EXCAVATOR LINE WITH 4 NEW SIZES

Famous American Dependability in ½-Yard Size and Up

Now you can have famous AMERICAN quality in ½-yard and in standard ¾-yard capacities in both crawler and truck-mounted cranes and excavators! American Hoist, famous for more than three-quarters of a century in the manufacture of the most rugged lifting equipment, offers to the construction field and to industry these new highly versatile machines that are low in cost and high in performance! They combine maximum ruggedness, ease of operation and high hoist and swing speed with long, trouble-free life. You'll get top daily production with these new AMERICAN models, yet you'll find that your initial investment and cost of operation are at a minimum. These new machines take their place beside other AMERICAN crawler and truck cranes that are proving their superiority on job after job across the nation and in Canada and Mexico. See the next two pages which show these great new AMERICAN machines, available now in sizes from ½-yard and up.

AMERICAN HOIST
and Derrick Company
St. Paul 1, Minnesota

TURN TO NEXT PAGE
FOR MORE DETAILS

½-YARD CRAWLER—100 SERIES. Years of research and planning went into the design of this new AMERICAN crane-excavator. Engineered for top production on any terrain—yet surprisingly low in cost! A compact machine—without an inch of waste space—easy to get at for routine maintenance. Shafts, gears and heavy wearing parts are of heat treated alloys for long life. Extremely wide clutches for safe, accurate operation . . . A producer from the word "Go!"

For more facts, use Reader-Reply Card opposite page 18 and circle No. 243

The Standard Steel Model 4A-150P portable concrete-batching plant can produce 110 cubic yards of transit-mix concrete per hour.

Portable batching plant has high productivity

■ A high-speed concrete batching plant that produces 160 cubic yards of dry-mix or 110 cubic yards of transit-mix per hour, yet knocks down into four component parts for easy transport on three flatbed trucks, is announced by Standard Steel Corp. of Los Angeles.

Simplicity of design is said to be the key to both the heavy capacity and the portability of the Model 4A-150P plant. Aggregates are stored in a 150-ton four-compartment bin and batched by means of a Hardy direct-reading dial scale. A 550-barrel batching and storage silo holds cement, which is weighed in a separate hopper and controlled by a Hardymatic electronic scale. Either an electric or gasoline motor drives a vertical bucket elevator which charges the cement storage silo.

Controls, operated by one man, include a three-batch selector system. All dials and controls are in full view of the operator.

Ease of maintenance is also said to reduce operating costs. The all-steel unit permits ready access to valves, controls, drives, bearings, and gates. Gate seals, leaves, and end castings are easily replaced, and two large inspection doors on the elevator casing facilitate servicing of that part.

According to the manufacturer, less than two days' time is required to erect this Standard Steel plant once the base has been prepared. It can be disassembled in less time for removal to a new location.

For further information write to Standard Steel Corp., 5001 S. Boyle Ave., Los Angeles 58, Calif., or use the Request Card at page 18. Circle No. 35.

Whiteman Mfg. Co. to build new plant

Whiteman Mfg. Co., Los Angeles, Calif., manufacturers of power buggies, finishing machines, vibrators, screeding machines, and truck mixers has made plans to erect a new plant in Pacomia, Calif. The first unit of the plant will cover five acres and have a floor area of 52,000 square feet. The plant is to be completed by January, 1956.

Folder on diesel engine

■ Cutaway photographs and complete specifications for its Model END 673 Thermodyne diesel engine are contained in a folder from Mack Trucks, Inc. Special emphasis is given to the economical fuel, operating, safety, and maintenance features claimed for the machine.

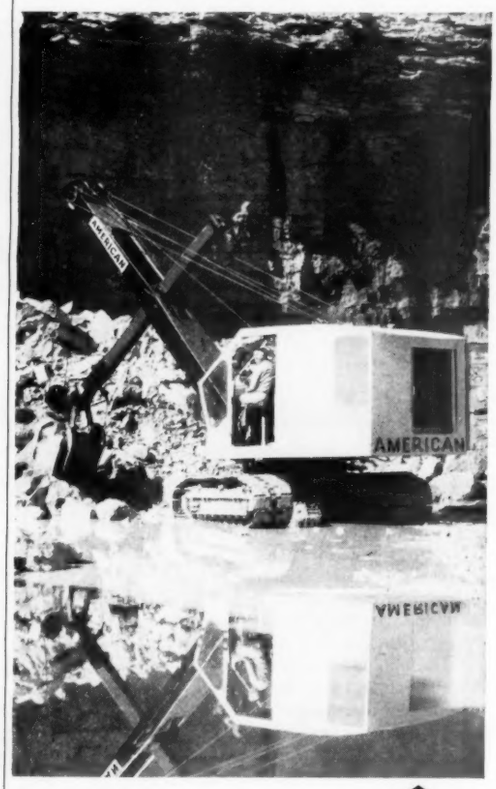
Rated at 170 brake-horsepower, the END 673 is a six-cylinder unit with 4⅞ × 6-inch bore and stroke. According to the folder, it incorporates rugged crankcase construction, long-wearing timing gears, controlled fuel distribution, and other features to insure good performance with fuel economy.

To obtain this folder write to Mack Trucks, Inc., 350 Fifth Ave., New York 1, N. Y., or use the Request Card that is bound in at page 18. Circle No. 13.

District sales engineer for Ingalls Iron Works

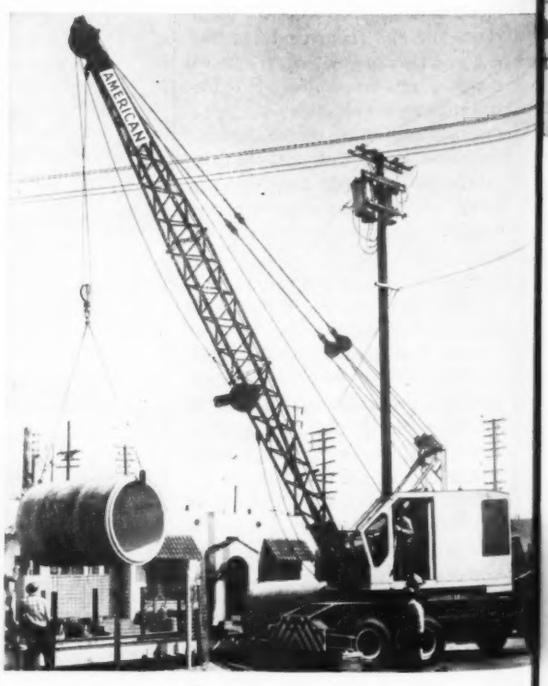
William E. Goodere has been made district sales engineer for The Ingalls Iron Works Co., Birmingham, Ala., and its subsidiaries, The Ingalls Shipbuilding Corp., the Ingalls Steel Construction Co., and the Birmingham Tank Co.

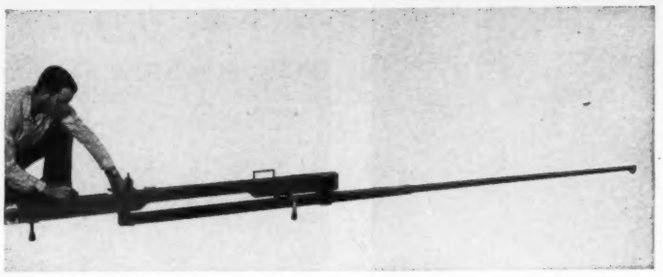
12½ AND 15-TON TRUCK CRANE—100 SERIES. These new AMERICAN truck cranes are completely engineered for crane-excavator service. You'll find them tops in low-cost efficiency with any front—crane, shovel, backhoe, dragline. A masterpiece of real versatility to let you handle more jobs faster! Move quickly and easily from job to job—travel over the highway at speeds up to 35 mph. Packed full of advance design features that add up to a real money-making machine!



STANDARD ¾-YARD CRAWLER—200 SERIES. If top production at low initial cost is your requirement, here's the machine for you—the new AMERICAN 200 series crawler! It has the ruggedness for which AMERICAN is famous—which means years of trouble-free service. Simple direct mechanical linkages give accurate feel of the load and fast, smooth operation. The operator's station is "out front" for maximum vision. Here's a machine with ground-hugging stability for any service—a machine that's been engineered to do your jobs faster at lower cost!

20-TON TRUCK CRANE—200 SERIES. Here's a real "all-around" crane—light in weight, yet with big capacity for its size. This new 200 series truck crane is designed for all fronts. Sensitive mechanical linkages make for outstanding accuracy, allowing the operator to inch loads into position. Its low center of gravity gives maximum stability with plenty of clearance. Engineered to withstand punishing service on all kinds of jobs, it features heat treated alloy steel gears and shafting and anti-friction bearings. You'll find this crane to be a real worker in the AMERICAN tradition!





The Benkelman beam apparatus measures the deflection in flexible pavements caused by moving wheel loads.

Beam device measures deflection of pavement

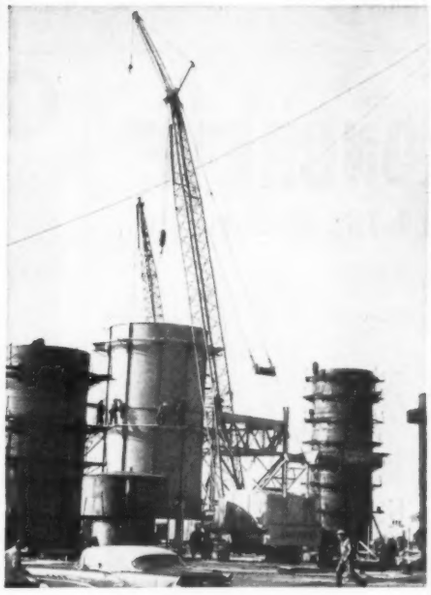
■ The Benkelman beam apparatus, a simple device for accurately measuring the deflection of flexible pavements under the action of moving wheel loads, is announced by Soiltest, Inc. Originally developed by the U. S. Bureau of Public Roads for use on its test road projects, the device is recommended especially for use in checking design criteria in the field on road test sections or actual highway construction.

In operation, the long probe beam is placed in position to pick up pavement deflections between wheels or adjacent to the tires of the test vehicle. The 12-foot aluminum probe beam has a ball-bearing pivot support to reduce rotational friction. The apparatus is supported on a hardwood maple stand. A dial indicator mounted on this stand measures the reflected deflection.

The Benkelman beam apparatus is provided with leveling screws and an adjustable rear support. The apparatus is completely self-contained. The light weight and simple design of the device makes it easily portable in the field and easy to operate, according to the manufacturer.

For further information write to Soiltest, Inc., 4711 W. North Ave., Chicago 39, Ill., or use the Request Card at page 18. Circle No. 9.

HEAVY-DUTY ¾-YARD CRAWLER —300 SERIES. Big extra-wide crawler pads, ruggedly built crawler frame and massive cast steel carbody for ground-hugging stability! Anti-friction bearings at every vital point for smooth, profitable operation. Toughest travel machinery in the field. Whether your need is for clamshell, dragline, shovel, backhoe or crane work, here's the heavy-duty crane-excavator that combines easy, accurate control with big-payload power!



FAMOUS 700 SERIES. Crawler and rubber mounted. 2-yard dragline, 1½-yard rock shovel and backhoe. Powerful 50-ton steel erectors crane, 45-ton truck crane. High operating speed provided with famous AMERICAN air controls, wide tandem band clutches and smartly-engineered shaft assembly. For simple maintenance and easy accessibility, you'll find the 700 series crane-excavators superior to any machine in the field. You'll get capacity loads on every pass with this great machine—now proving its superiority on jobs of all kinds!

AMERICAN HOIST
and Derrick Company
St. Paul 1, Minnesota

American Paces the Field in Crane-Excavators!

SEND COUPON TODAY FOR MORE DETAILS

AMERICAN HOIST AND DERRICK COMPANY,
ST. PAUL 1, MINNESOTA

Please send me full details on your expanded line of Crane-Excavators. I am particularly interested in .....½-Yard Crawler .....12½–15-Ton Truck Cranes .....Standard ¾-Yard Crawler .....20-Ton Truck Crane .....300 Series Crane-Excavators .....700 Series Crane-Excavators.

Name_____

Company_____

Address_____

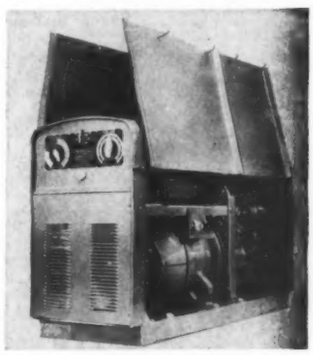
City_____ State_____

For more facts, use Reader-Reply Card opposite page 18 and circle No. 244

Diesel unit powers new 250-amp welder

■ A new diesel-powered welder for pipeline, structural, and general construction welding has been announced by The Lincoln Electric Co. Called the Shield-Arc SAE-250, the unit is rated at 250 amp on a 40-volt 60 per cent continuous-duty cycle.

Featuring diesel-powered welding capacity in a relatively compact, low-cost unit, the welder is said to weigh approximately 20 per cent less and cost 25 per cent less than a comparable 300-amp welder.



The Lincoln Shield-Arc SAE-250 diesel-powered welder.

The new Shield-Arc welder has a range of 50 to 300 amp, handling electrodes from 1/16 to ¼-inch in diameter. The welding generator is equipped with power outlets to provide 115-volt dc auxiliary power for operating tools and lights.

The welder is powered by a new Hercules diesel engine, the DIX-4D, a four-cylinder, four-cycle engine rated at 39-hp at 1,700 rpm. It is equipped with a 12-volt starting motor and an ether injection system for cold weather starting.

For further information write to The Lincoln Electric Co., P. O. Box 5758, Cleveland 17, Ohio, or use the Request Card at page 18. Circle No. 110.

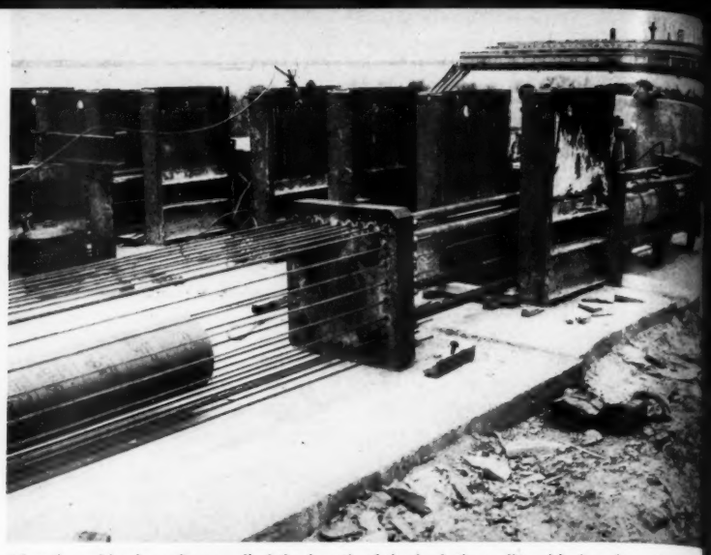
Ball-bearing swivels

■ A circular describing its ball-bearing swivels for use with cables, chains, tension rods, and other rotating apparatus is available from the Miller Swivel Sales Co., Box 938, Pomona, Calif. Specifications and a complete explanation of the construction and operation of these swivels are given.

To obtain this circular write to the company, or use the Request Card at page 18. Circle No. 61.

Thirty Roebling cold-drawn 7-wire cables, passed through end supports and spiral loops, are secured to the contractor-built pulling block as the prestressing operation begins. Stockpiling is done by the Manitowoc 3000-B in background.

C&E Staff Photos



After the cables have been pulled the length of the bed, the pulling block, released from its four-wheel roller and attached to the Rodgers 300-ton hydraulic jack, becomes a bulkhead. Cables are secured to the pulling block with Reliable grips.

Precasting and driving piles — a big job at Hampton Roads

Work on a tunnel, bridges, and a pair of artificial islands created with hydraulic fill could hardly be more unrelated. But Merritt-Chapman & Scott Corp., New York, N. Y., is dovetailing all three projects in building a 3½-mile tunnel-bridge running over and under Hampton Roads, Va.

The $19,050,461 contract being handled by M-C&S is for the most intricate and important section of a 23-mile $63 million highway project—the largest single endeavor of the Virginia Department of Highways to date. When the bridge and tunnel job is finished in the fall of 1957, it will provide the first direct vehicular connection between the Norfolk and Hampton areas, and will eliminate the need for the ferry service now operated by the state highway department.

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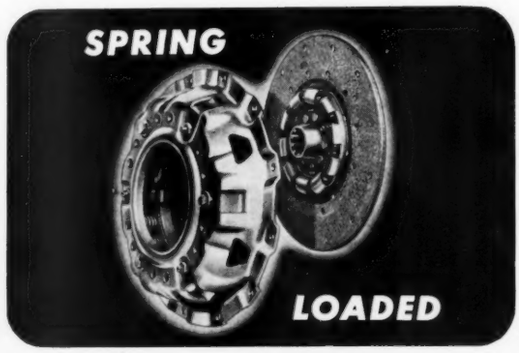

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CLUTCHES

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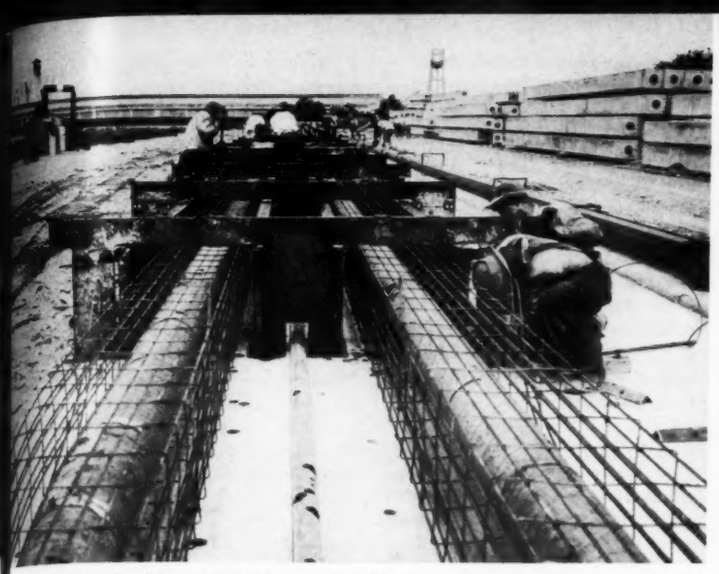

A 3-ton load is maintained on each cable as workmen position Sonovoids and stretch spiral loops out along the pile before concrete pouring. The template holding the side forms has two notches, one for pouring and one for stripping.

The pulling bars of the hydraulic jack, bolted to the end support during pouring, keep a total load of 6 tons on the cables. Concrete is chuted into forms by a Worthington mixer on a Mack truck which rides alongside the stressing bench.

Basically the M-C&S contract calls for a 6,859-foot-long tunnel, flanked by artificial "portal" islands, that will facilitate the road's transition from the tunnel to the trestles on either side. The southern approach trestle, approximately 6,150 feet long, will connect Willoughby Spit near Norfolk to a south portal island. The tunnel will run from here under Hampton Roads, emerging at another portal island where the roadway will be carried to Phoebus, near Hampton, by the north trestle bridge, a structure about 3,250 feet long.

Approach spans

The north approach bridge consists of 64 pile bents—22 tower bents and 42 intermediate bents. The southern approach trestle consists of 122 pile bents spanned by 50-foot-long prestressed-concrete beams.

Of the 122 bents, 63 are made up of 21 six-pile tower bents and 42 four-pile intermediate bents. Two intermediate bents will be placed between tower bents. Piles for these measuring 24 × 24 inches in cross section, are being precast and prestressed in the contractor's casting yard on Warrington Avenue in Norfolk, about five miles from the bridge. Here they are loaded onto flatcars by a Manitowoc 3000-B 35-ton crane which makes the lift by means of two wire hooks embedded in the piles. A railroad spur into the casting-yard stockpile area facilitates shipment of the piles to Pier No. 3 in Norfolk, where another Manitowoc transfers the piles onto barges. Once the 24-inch piles are driven to a 95-ton bearing

(*Continued on next page*)

Here's What Users Have to Say About

MARVEL Synclinal FILTERS

SUMP TYPE (Cutaway)

U. S. STEEL CO., Irvin Works Three-Stand Cold Reduction Mill—

"Marvel Synclinal Filters are a part of the mill's main hydraulic system which operates Coil Cradle as well as other hydraulic machines."

JONES & LAUGHLIN STEEL CORP., Aliquippa Works—

"Marvel Synclinal Filters proved their effectiveness when one of the motors on the hydrostatic pipe testers broke down. A brass fitting was chewed up and jagged pieces of brass were carried into the oil stream. Any small piece could clog the circuit resulting in costly "down-time." These pieces of brass could also have caused a great deal of damage to the expensive equipment. However, when the unit was inspected, it was found that all metal particles had been filtered out by the Marvel Synclinal Filters and no damage had been done to the equipment nor was there any loss in operating time. Two filters are installed on each circuit so that one can serve as a bypass while the other is being cleaned. Although it takes only about fifteen minutes to clean the monel filter insert, even this short interruption in production could be costly in an operation of this size.

MANY OTHERS REPORTING SIMILAR RESULTS ARE NOW SPECIFYING MARVEL SYNCLINAL FILTERS ON ALL NEW HYDRAULIC EQUIPMENT — AND STANDARDIZING WITH MARVEL SYNCLINAL FILTERS ON ALL EXISTING EQUIPMENT

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With the entire stress applied to cables, a Manitowoc Speedcrane completes the job of setting side forms for two piles.

(Continued from preceding page)

by a second barge-mounted crane, caps are cast in place.

For the remaining 59 bents located in unsatisfactory riverbed material just south of the south portal island, M-C&S is using two 54-inch-diameter piles per bent. These cylindrical piles, furnished by the Raymond Concrete Pile Co., New York, N. Y., have a 5-inch wall containing 12 No. 6 M. B. oil-tempered cables used in prestressing. The cables are encircled by ¼-inch spiral running the length of the pipe.

In their manufacture by Gulf Prestressed Concrete Products, a Raymond licensee at Morgan City, La., the piles are formed by spinning very dense concrete, so that the cylindrical 5-inch-thick walls are built up by centrifugal force. The ¼-inch spiral is embedded into the walls as the pile is built up. To facilitate the formation of varying lengths of pile, Raymond makes the cylindrical sections 4, 8, and 16 feet long. After curing, these sections are placed together and the prestressing cables are threaded through holes running longitudinally through the walls. The cables are then tensioned by joining the sections into a prestressed pile of desired length.

The first of these piles, driven last May, was painted with a wide band of water-gas tar at the approximate level water would reach when the pile had been driven. But it was later decided that such protection was unnecessary because of the denseness of the concrete in each pile.

Special hammer required

Arriving at Norfolk on three flatcars from the Raymond plant at Morgantown, the piles are transferred to tug-powered barges which transport them, three at a time, to the Chickasaw, an American 50-ton barge-mounted revolver handling the positioning and driving job.

The Chickasaw, equipped with a 135-foot boom, is using a special hammer designed and furnished by Raymond to drive the 54-inch piles. This No. 4/0 single-acting hammer has a total weight of 23,800 pounds, 15,000 pounds of which is striking parts, and provides 48,750-foot-pounds of energy with each 3¼-foot stroke. It is designed to slip over the outside of the pile, bringing a plywood bearing ring to rest along the circumference of the pile to protect its wall.

As the barge delivering three piles to the Chickasaw is securely tied along the portside of the revolver, the crane picks up the middle pile first so that the weight of the other two piles is distributed evenly on the barge to give it lateral stability. Some piles are approximately 88 feet long, and their tremendous weight, at times, creates problems when the water becomes rough; but M-C&S' experienced crew is having little difficulty handling them.

Pile-driving specifications require a minimum penetration of 30 feet, with at least 10 feet of the pile driven into undisturbed firm riverbed material. To get this penetration, crews jet out a 20-foot-deep hole about 6 feet in diameter as soon as the driving template on the starboard side of the Chickasaw is correctly aligned by survey lines. Jetting is done with a jetting pipe having a 4-inch inside diameter which tapers to a 1½-inch-inside-diameter outlet.

A flexible hose connects the jetting pipe to a Griffin pump which supplies the water at 200 pounds pressure. This pump is mounted forward on the Chickasaw with its rubber intake line hanging over the side.

When the hole has been jetted, and the jetting pipe unhooked from the

5 SUPERIOR WAYS OF HANGING FORMS FROM STEEL BEAMS AND GIRDERS
(NOT FIREPROOFED)

Especially designed to meet field conditions on BRIDGE SUPERSTRUCTURES

Standard Coil Hanger Frame

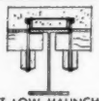
When hanging forms where specifications do not permit any hanger wire to be exposed after stripping, use Superior *Standard* Hanger Frames. Detail at left shows their use with double ledgers, ½" coil bolts, and flat washers. Total safe load on both bolts is 10,000 lbs., or 5,000 lbs. per bolt.

Plate Hanger Frame

FOR ADJUSTMENT FROM TOP OF DECK

The Plate Hanger Frame, shown at left, has metal plates with a punched hole instead of wire coils. The Coil Bolts are passed through the holes and secured from above with coil nuts. The plates provide adequate bearing for the nuts, which being square will not turn when the bolt is removed. The installation and necessary adjustment to bring the deck forms tight against the flange are from above the deck. The total safe load on both coil bolts is 10,000 lbs., or 5,000 lbs. per bolt.

Special Hanger Frame

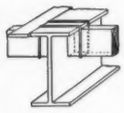


AT LOW HAUNCH

AT HIGH HAUNCH

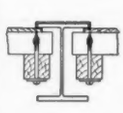
The design of certain bridge superstructures allows for the permanent deflection of the beams or girders due to the pre-calculated dead load. This deflection is compensated by a concrete haunch on the upper flange, which varies in depth. Superior *Special* Coil Hanger Frames were developed to meet this field condition, at the same time avoiding any exposed hanger wire. The extent to which the ½" Coil Bolts are threaded into the coils allows for these varying haunch depths from maximum to zero. (See detail at left.) Total safe load per frame is 10,000 lbs., or 5,000 lbs. per ½" bolt .

Wire Beam Saddle



Wire Beam Saddles are used to hang centering joists from structural steel beams when the beams are not fireproofed with concrete. On non-fireproofed structures the load is determined by the allowable spacing of centering joists rather than the capacity of the hanger. Available in three gauges and sizes as required. Will carry safely, total loads of 2,500 lbs. to 6,000 lbs. Layouts and estimates will be sent upon receipt of plans or quantities. No obligation.

Coil Beam Saddle



Superior Coil Beam Saddles are used, as shown at left, where hanger wires may be cut after stripping the forms. The Coil Bolts allow for any variation in lumber and flange thickness and tightening the bolts pulls the forms tightly against the flanges. Forms are easily stripped. Safe load is 6,000 lbs. per saddle, or 3,000 lbs. for each ½" Coil Bolt. Coil Beam Saddles are also furnished for ¾" and 1" bolts.

WORKING PARTS (Bolts and washers) are returnable. Layouts and estimates for Superior Hangers are available without obligation.

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The Chickasaw, the barge-mounted American revolver, keeps a pile about 15 feet in the water during the 180-degree swing to the template to reduce side sway.

revolver, a Raymond pile is picked up by means of wire rope wrapped around the upper quarter point, swung around from port side to the driving template at the starboard side, and dropped into the hole. During the 180-degree swing the bottom 15 feet of the pile is kept in the water to reduce any side sway and facilitate positioning in the template.

A final survey check is always made of the template just before the pile is slipped into position. If any major adjustments are necessary the Chickasaw re-positions itself by slacking off or tightening up on the anchor lines. If the adjustment is minor—a few inches in any direction—the template is re-positioned manually until correct alignment is established.

After the pile is in the hole, enough vertical stability is obtained to allow the supporting wire rope to be removed and the Raymond hammer to be set in driving position on the pile. The pile is then driven at least 10 feet or more until 120 blows per foot of penetration is reached. At first a short stroke of approximately 1½ feet is used. When visible resistance is encountered, the longer 3¼-foot stroke completes the driving.

Approximately 250 tons bearing is realized on each Raymond pile with a relatively shallow penetration. This is largely due to the increase of skin friction on the inside and outside of the cylindrical walls. Two of these piles placed on 20-foot 8-inch centers make up a typical Raymond pile bent.

As soon as the piles are in place and cut off at the proper elevation, sand is poured into them until it comes within four feet of the top. A precast and prestressed pile cap 34 feet long, 7 feet 9 inches deep, and 4 feet thick will be keyed into the piles with 4-foot-long keys and grouted into place. These pile caps will be made at the contractor's casting yard, then transported to the bridge approaches in the same manner as the prestressed piles.

Pile casting setup

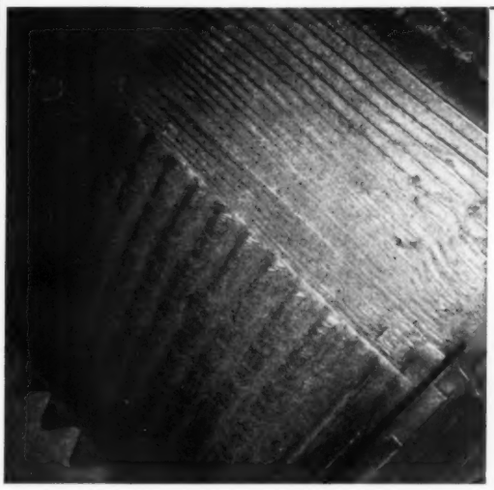
At the Warrington Avenue casting yard, where yard manager Alonzo D. Vick, Jr., is supplying 594 prestressed piles, about 1,400 prestressed beams 50 feet in length, and 59 precast bent caps for Raymond piles, good production is being achieved through the use of two devices—a contractor-built stressing bench and a bed of 30 spindle-mounted cable drums—capable of tensioning 30 prestressing cables at one time. On an average, the 24×24-inch piles for the approach trestles are being turned out in various lengths at a rate of 14 per 8-hour day.

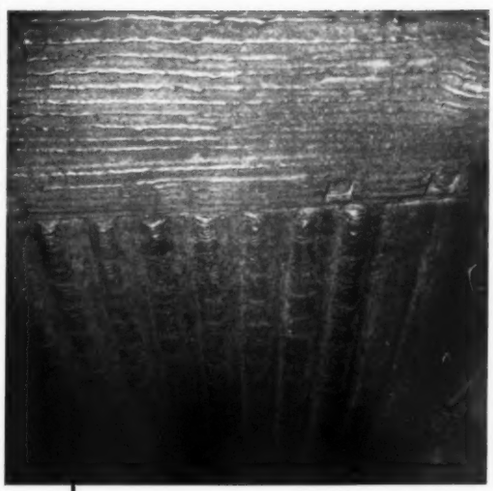
The almost 600 piles required by both approach structures are being cast on two 9-inch-thick concrete casting beds, each having an over-all dimension of 418 feet×18 feet 8 inches —enough for a total of 8 form lanes. In an average day, two lanes of piles are poured, furnishing 7 piles per lane. The length of these piles varies, depending on where the bulkhead is placed. Working closely with the contractor's yard manager on this work is Freyssinet Co., Inc., New York, N. Y., which designed the beds and is consultant on the job. Freyssinet's field engineer is Ed J. Maexner.

The 30 prestressing cables used for each pile are Roebling cold-drawn stress-relieved 7-wire strands, ⅜ inch in diameter, which are fed from 30 drums through the end support and wire spiral loops before being attached to the pulling block with Reliable grips. The pulling block rests on a four-wheel roller and consists of a 3-inch-thick steel plate with 30 cable holes conforming to the spacing of cables in the cross-section of the pile.

Four larger holes in the block, located at the inside corners of the cable holes, serve a double purpose. They provide a connection with the four-wheel roller by pinning four bars to the block, thereby obtaining a well distributed pull among the 30 strands. Then, with the roller removed after the block has been towed the 400-foot length of the lane, the four hydraulic jack bar connections are passed through the openings and securely bolted to the block. In this way the block becomes a bulkhead, allowing all 30 cables to be prestressed simultaneously.

Once the pulling block has been attached to the hydraulic jack, the





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cables are cut at the end support, and each strand is given an initial pull of 400 pounds by a Chisholm-Moore puller and secured to the end support with Reliable grips. This first equalizes tension in the prestressing strands. Then a Rodgers 300-ton hydraulic jack is connected to the pulling block, and each strand is tensioned again, this time with approximately 50 per cent of the 6-ton ultimate required stress. This loading gives the strands some tautness, but leaves them flexible enough so that 10-inch-diameter Sonovoids can be placed between the strands.

When the Sonovoids have been placed, the wire spiral loops encircling the stands are stretched out along the length of each pile. Sonovoid sections are spliced with a tube 9½ inches in diameter and 18 inches long, which is placed inside the adjacent section of Sonovoids. These sections are held in final position by the bulkheads making up the different lengths of piles.

With the spiral tied to the prestressing strands, and the Sonovoids and bulkheads in place, the concrete lanes are given an application of wax to prevent concrete from sticking to the beds, and the steel side forms for a two-lane pour are set in place by a Manitowoc 3000-B 35-ton crane.

Steam curing concrete

Before the 5,000-pound concrete is poured into the forms, the remaining load is applied to the strands. With the total 6-ton stress on each strand—approximately 150,000 psi—the average elongation of 410 feet of cable is about 26½ inches.

Southern Materials Co., Inc., Norfolk, is supplying concrete to the job in Worthington 5½-cubic-yard mixers mounted on Mack trucks which ride alongside the stressing bed as concrete is chuted into the forms. Vibro-Plus gasoline-driven vibrators consolidate the 100-cubic-yard pours made per average 8-hour day.

After an initial set of 5 hours, forms are covered and the concrete is steam cured at 140 to 160 degrees for 18 hours. When two test cylinders show a strength of 4,200 psi, tension on the strands is released, the steam is shut off, and the piles are stripped by releasing the side forms from the templates and prying the forms away. A second notch on the template keeps the forms in the released position as workmen continue to strip the length of the pile.

Part of the reason for the high rate of production on the piles lies in the fact that the concrete is being steam cured. Water curing would require at least 7 days to elapse before forms could be removed; steam curing can be done in 24 hours.

A minimum of 14 days must elapse between the pouring and the driving of a pile. One of the piles, in a test of durability, was driven to a 95-ton bearing ten consecutive times without showing any sign of damage.

Stockpiling in the casting yard is being done by the Manitowoc crane, which picks up completed piles by two wire hooks embedded in the concrete during precasting operations. Piles ready to be shipped to the site are first loaded onto the flatcars riding the spur which leads from the center of the stockpile. After the rail trip to Pier No. 3 in Norfolk, piles are transferred onto barges by another crane.

When piles have been driven to a 95-ton bearing by a barge-mounted American revolver at the work site, caps for the 24-inch piles will be cast in place with 3,500-pound concrete, and stringers spanning the bents will be placed on 5-foot 2-inch centers.

Concrete deck

A 6¾-inch-thick deck of 3,500-pound concrete will be poured monolithic with diaphragm stiffeners between the stringers. The deck and stringers will be tied together structurally by transverse prestressing on the approach trestles. Freyssinet 18-wire strands 1.96 inches in diameter will be passed through flexible tube openings, through the stringers and diaphragm stiffeners, tensioned, and finally grouted into place.

The two tunnel approaches will have a 30-foot roadway between 10-inch curbs. On either side of the roadway, 2-foot safety walks will be provided. The elevation of the north trestle structure will be 16.4 feet above mean sea level. From this elevation, the roadway will descend into the tunnel via the open approach at the north portal island on a 4 per cent grade. Then a grade of 0.5 per cent will bring the roadway to the opposite side of the ship channel, where it will ascend on a 4 per cent grade to the south trestle structure, which is also at an elevation of 16.4 feet above mean sea level.

Personnel

Robert I. Senn, a veteran of many water-crossing projects, is the project manager, and J. Yeary, the project engineer, for Merritt-Chapman & Scott Corp. Homer Wilkes has the responsibilities of general superintendent for M-C&S. George Murphy is the project engineer, and Roger Stevenson, the resident engineer for the consulting engineering firm of Parsons, Brinckerhoff, Hall & Macdonald, New York, N. Y. The project is being built for the Virginia Department of Highways, which has Gen. J. A. Anderson as commissioner and William R. Glidden as chief engineer.

THE END

Another Cleaver-Brooks Mobile Boiler in action:

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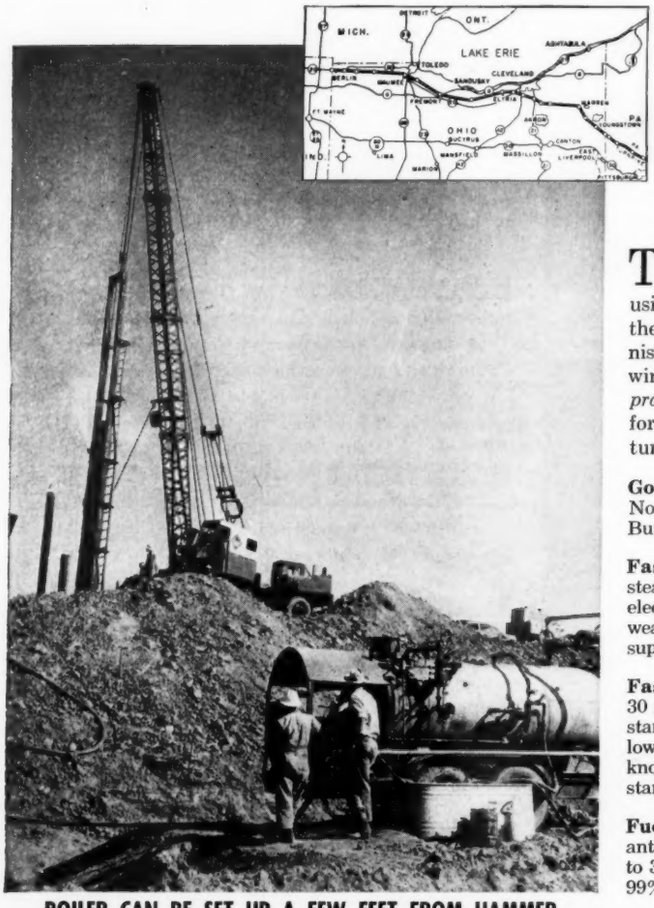

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THE Ohio Turnpike is making headline news because contractors are using up-to-the-minute methods across the board. And portable steam, furnished by Cleaver-Brooks boilers, is winning acclaim. It *guarantees the most practical, economical way* to drive piles for many of the 282 scattered structures along the way. Here's why:

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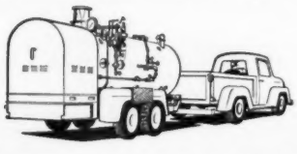


Two models are available: 80 and 125 hp, 150 lbs. working pressure, trailer or skid-mounted. You'll find wide usage for extracting, asphalt plant, ready-mix, winter concrete operations, thawing and miscellaneous heating. Write for a copy of Catalog RM-108. Cleaver-Brooks Co., Dept. M, 397 E. Keef Ave., Milwaukee 12, Wis.

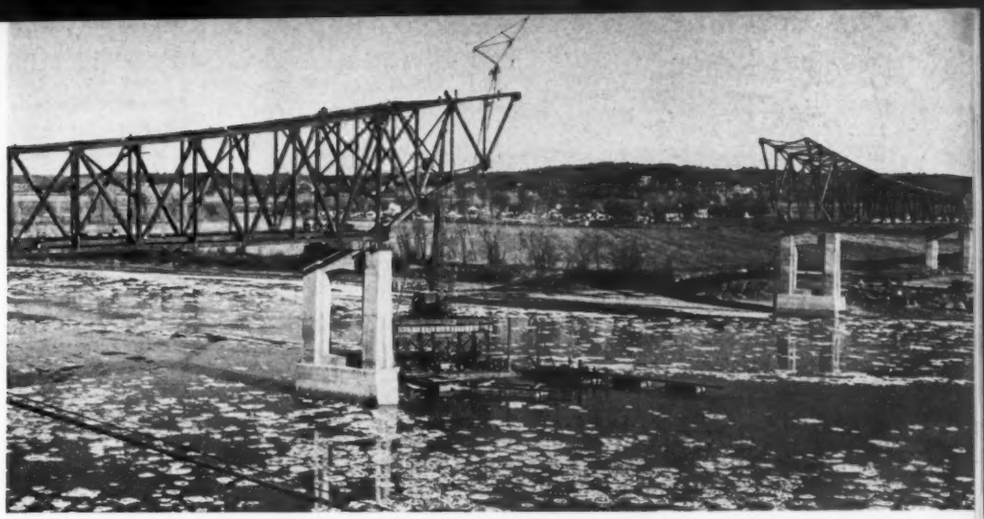
Built with the famed Four-Pass High Efficiency Design by the originators of the self-contained boiler

Cleaver Brooks

For more facts, use Reader-Reply Card opposite page 18 and circle No. 251

Winter Work

Erection of bridge steel is carried on through winter



Working despite ice in the Missouri, the combination stiffleg and guy derrick places superstructure steel.

Despite zero temperatures and ice floes on the Missouri River at Jefferson City, Mo., last winter, contractors charged with construction of the new 3,094-foot Missouri River bridge worked to good advantage almost every day so that erection of structural steel, timed for that period of the year, went on unhampered by weather.

The work sequence for contracts and subcontracts, timed by Missouri highway engineers so that work could go on even during winter, was largely responsible for getting the new structure opened to traffic recently. Pacific Bridge Co., San Francisco, Calif., starting work on the south approach in June, 1953, subcontracted some work to speed river piers to completion by April, 1954.

Fruin-Colnon Contracting Co., St. Louis, Mo., subbed the piers in the north approach. Erection of structural steel, both on this and the main truss-span contract, was subbed to John F. Beasley Construction Co., Muskogee, Okla. The north approach floor was done by Harlin Construction Co., West Plains, Mo. Stupp Bros. Bridge & Iron Co., St. Louis, Mo., was the prime contractor on structural steel over the main truss spans, with Beasley subcontractor on the erection. Maxwell Bridge Co., Columbus, Kans., picked up the subcontract for the Haydite concrete floor on the main bridge deck; Fisher Electric Co., took the electric work; and Al-Bro Mfg. Co., St. Louis, supplied and erected the aluminum handrail.

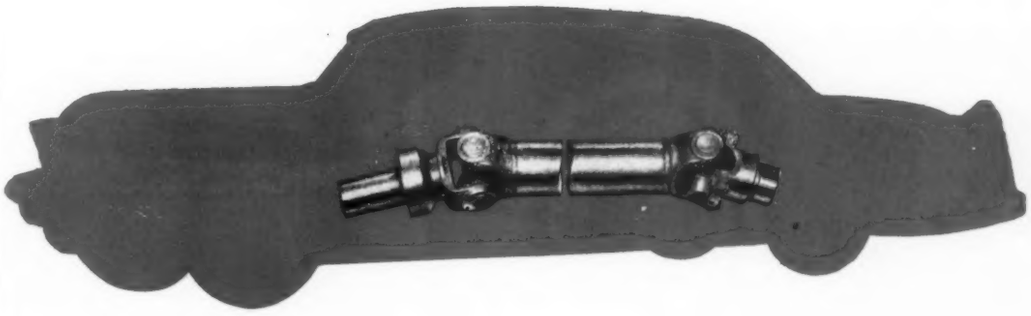
Modern span

The new bridge, replacing an antiquated narrow structure, has a 28-foot roadway and two 5-foot sidewalks. Future widening, possible if the guardrail is removed and sidewalks placed outside the truss, will permit the bridge to carry three lanes of traffic.

The bridge consists of a main truss section 1,472 feet long, a south approach 174 feet long, and a north approach 1,448 feet long. Concrete piers, founded on solid bedrock by men working under compressed air, were constructed in the river and at the south approach. The same type of concrete piers, founded on 82 to 84-foot steel H-beam piles, were built for

(Continued on next page)

NEW



For the very latest in design and highest quality workmanship — America's leading automobiles rely on MECHANICS. MECHANICS drive lines are engineered to meet each customer's specific needs. Torque, size, weight, balance, angularity, runout, safety, lubrication, assembly and service problems all have been overcome — to each customer's complete satisfaction. Let us help engineer joints and drive lines to fit Your products.

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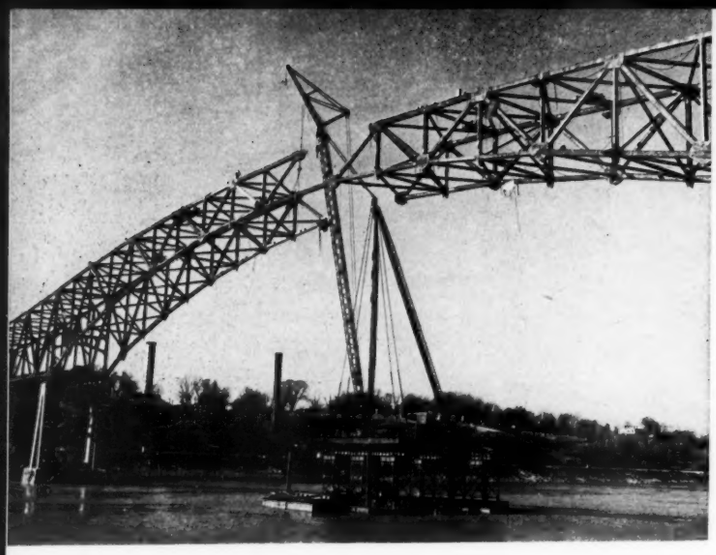
UNIVERSAL JOINTS
For Cars • Trucks • Tractors • Farm Implements • Road Machinery • Aircraft • Tanks • Busses and Industrial Equipment

For more facts, use Reader-Reply Card opposite page 18 and circle No. 252



Final closure of the main tied-arch span is made by the derrick while the river is free of ice. The 110-foot mast is braced by a rigid leg connected to the triangular base, and cable guys provide side bracing.

(*Continued from preceding page*)

the north approach section. Structural steel for the main truss section is a three-span continuous tied arch truss which carries a lightweight concrete deck. All structural steel members were fabricated with inspection holes to facilitate painting and riveting.

Winter work moves rapidly

During the winter of 1953–54, concrete for the river piers was poured and protected under Wenzel tarps. Salamander heat was added when necessary. By November, construction of the piers was finished, and work was ready to start on one of the most vital phases of the project. Completion of the span by midsummer of 1955 hinged on whether or not skilled ironworkers could safely work while the river was full of ice.

For winter work, John F. Beasley, the firm which did steel erection for the Mississippi River structure at Hastings, Minn., brought to the site a derrick which had proved itself in other work.

A combination stiffleg and guy derrick, the rig handled the heaviest steel on the job. Its 110-foot mast, mounted at the middle of one leg of the triangular subframe, was reverse-braced by a rigid leg which was connected to the vertex of the triangular base. Side bracing was provided by cable guys connecting the top of the mast and the other two points of the triangle.

A 150-foot boom with a 40-foot jib, attached to the mast base, permitted a bullwheel to rotate both the mast and base. An American 4-drum hoist, torque-converter-powered from a Cummins diesel, operated the rig. All controls for the four drums and the auxiliary swing drum were actuated by compressed air.

The subframe of the machine was carried on wheels running on a special track. For this operation, a section of the track was mounted on floats, and a raised system of vertical steel members gave the mounting a gantry effect. The wheels locked securely when the machine was in position, making the derrick an efficient piece of floating equipment. Floats under the rig consisted of welded steel pontoons 10 feet wide, 20 feet long, and 4 feet deep, which were sufficiently sturdy to withstand the pressure of surface ice floating down the Missouri.

Motive power in the water was provided by three deck engines having cables secured to heavy anchors. These 1⅛-inch cables were handled by two Bayard rope windlasses, driven by Wisconsin engines. The winches were mounted near each front corner of the subframe, the cables leading through snatch-blocks at the rear.

An American two-drum hoist, driven by a Minneapolis-Moline engine, handled the ¾-inch cables attached to downstream anchors. These lines were used chiefly to guide the machine. The heavier pulling load upstream was handled by the heavier lines. Working with the Missouri's current, this control-line system made the floating derrick fully mobile as it worked upstream from the bridge.

With this derrick equipment on the job, Beasley was able to continue construction all winter. The floating derrick, strong enough to stand up under battering from the ice, hung steel members as they were delivered to the job. Arriving at an unloading point at Jefferson City by rail, the steel was trucked to the construction site, unloaded by a crawler crane to pontoon transportation, and towed to

Rolling out the carpet for the Air Force —at 200 tons an hour

Bowen Construction's new GMC fleet speeds crushed rock deliveries for new runways at Sedalia AF Base

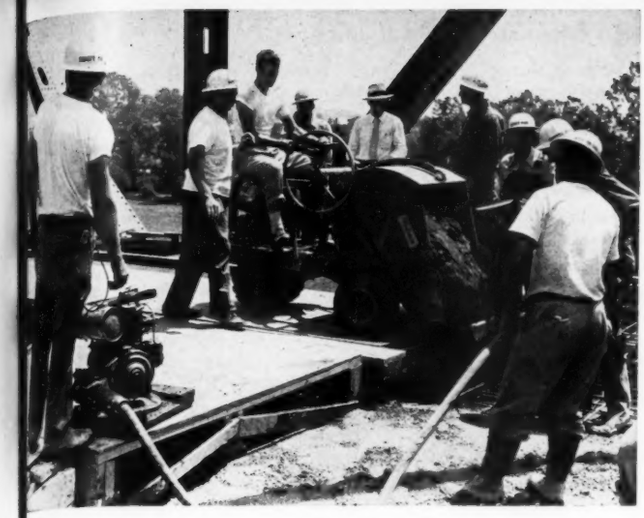
A TEAM OF 14 NEW GMC W503 TANDEMS are handling this half-million-dollar improvement project at Sedalia Air Force Base, Knobnoster, Missouri. Bowen Construction Company of Kansas City, Mo., contracted to supply 170,000 tons of crushed rock and 30,000 tons of asphalt for paving. The job was rushed to completion by the new GMC's—delivering 200 tons of the crushed rock each hour.

HUSTLING 13 TONS OF CRUSHED ROCK APIECE AT A CLIP, these GMC's set a fast pace over the 9-mile span between quarry and job site. The trucks use 10-yard bodies with twin telescopic hoists. Their hefty loads are carried over GMC's new oversized axles — rated at 7,000 lbs. front and 22,000 lbs. tandem rear.

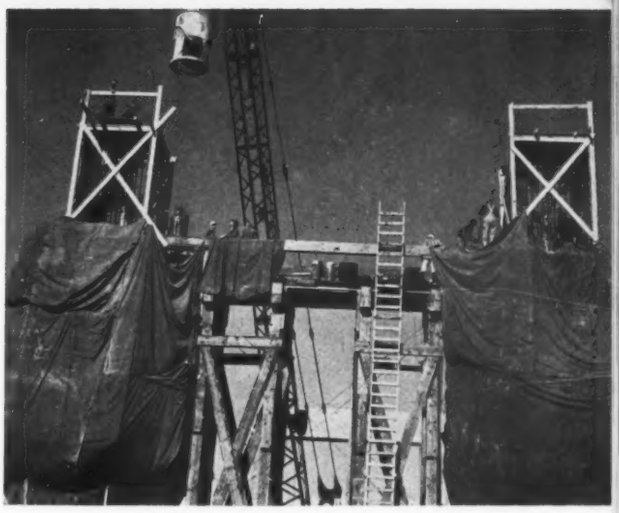
POWER TO PULL THROUGH THE ROUGHEST GOING comes from the W503's big new 155-horsepower engine. Despite the stop-and-go nature of the paving operation, the 14 trucks are averaging 7 mpg. The contractor's satisfaction with GMC tandems — one of 19-models—is evidenced by his recent order for 6 additional units.

GMC TRUCK & COACH — *A General Motors Division*

For more facts, use Reader-Reply Card opposite page 18 and circle No. 253



◄ A Whiteman power buggy places lightweight concrete, hauling from a transfer hopper supplied by truck mixers.



In the first winter of construction, fresh concrete for the river piers was protected by Wenzel tarpaulins. ►

the unloading position at the derrick.

Winter work speeds paving

The result of the all-winter construction was that paving of the lightweight concrete deck could be started early. Forms for the deck of the truss spans were placed during the erection of structural steel, and Maxwell Bridge Co. was able to start work sooner because steel work was well ahead.

Although paving with lightweight concrete was new to the Missouri State Highway Department, the job was done rapidly.

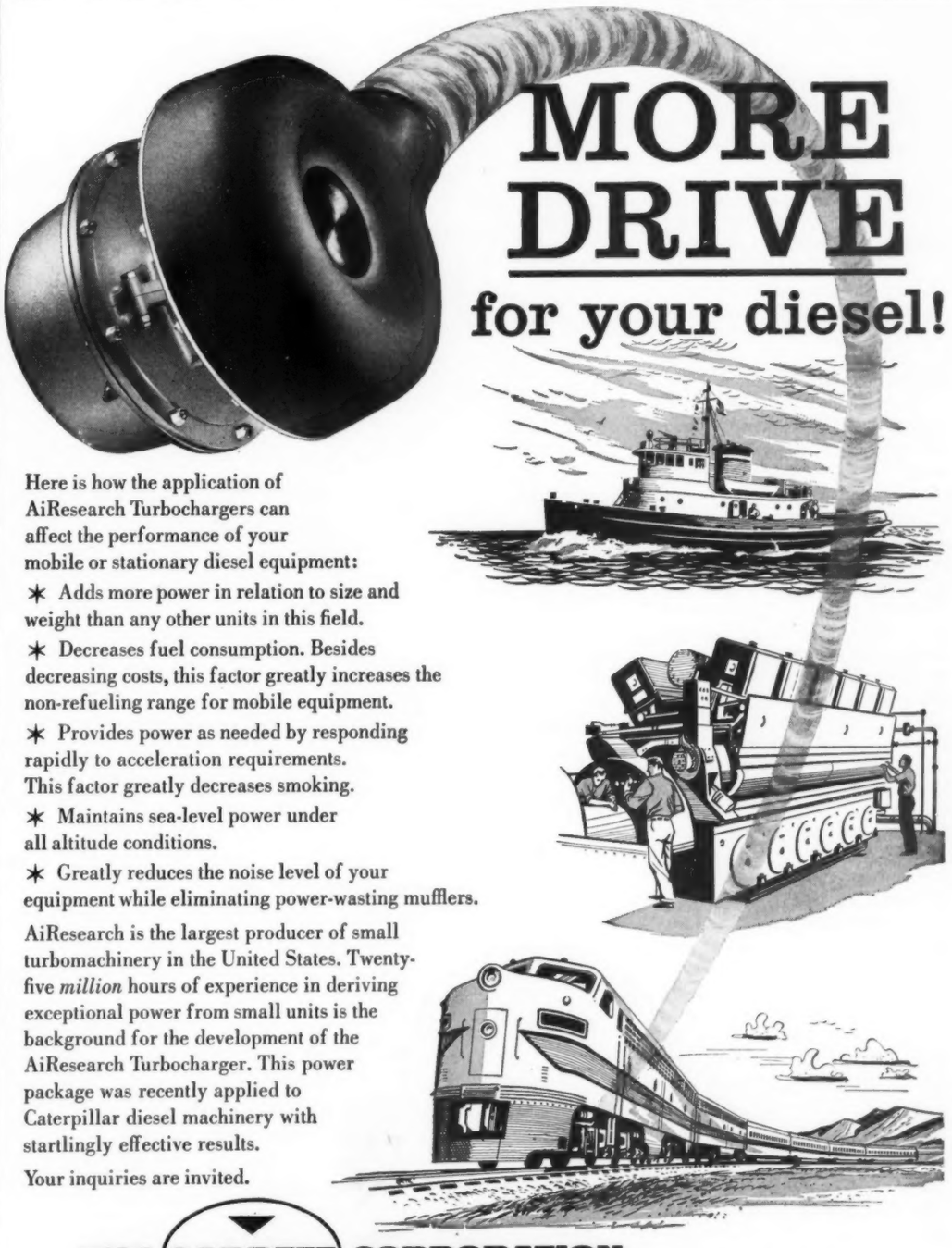
Using the steel members for deck form support, Maxwell arranged a conventional prefabricated forming system that was easily stripped after the concrete had been placed. The forms were hung from the structural members by steel snap ties and where necessary, were given further support by timber shoring placed underneath on structural webs. Reinforcing steel for the deck was then placed, and the pour was ready.

Haydite lightweight aggregate, shipped in from Kansas City, was used for the deck mix. It was batched from Farmer's Concrete Co., Jefferson City, and hauled to the job by Jaeger truck mixers. In most cases it was impossible for truck mixers to dump directly into the pours, so a Gar-Bro transfer hopper and four Whiteman power buggies were used to place the concrete. The buggies operated on prefabricated runways to move the concrete to its point of placement.

In placing the lightweight material, Maxwell held the slump down to about 1½ inches. The slab was surface vibrated by a Jackson vibrating screed before it was given a final finish.

By August 1, the new bridge was ready for U. S. 54-63 traffic, thanks to the combination of summer and winter construction.

Design of the new bridge was under the general supervision of R. M. Whitton, chief engineer of the Missouri State Highway Department, with J. A. Williams as engineer of bridges. Field supervision was under district engineer V. B. Saville of District 5, Jefferson City, with James Glen as resident engineer on the project. THE END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for your diesel!
Here is how the application of AiResearch Turbochargers can affect the performance of your mobile or stationary diesel equipment:
✶ Adds more power in relation to size and weight than any other units in this field.
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AiResearch is the largest producer of small turbomachinery in the United States. Twenty-five million hours of experience in deriving exceptional power from small units is the background for the development of the AiResearch Turbocharger. This power package was recently applied to Caterpillar diesel machinery with startlingly effective results.
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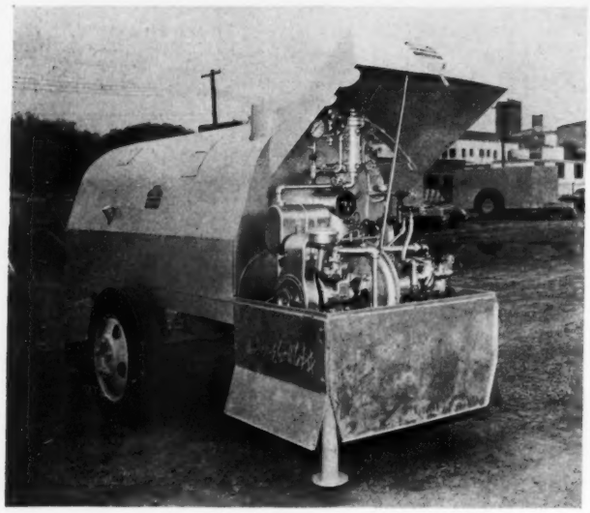
DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND RELATED MACHINERY
For more facts, use Reader-Reply Card opposite page 18 and circle No. 254



This Bros portable steam generator, mounted on two wheels for easy towing behind a truck, has adjustable stiff legs at front and rear for leveling the boiler on uneven ground.

Portable steam units for cold-weather work

■ Delivery of hot dry steam in 20 minutes from a cold start is claimed for Bros portable packaged steam generators. These units are said to be speedy and efficient on cold-weather projects where concrete-curing, heating of catch basins and culverts, or heating of oils, asphalts, tars, pitches, and other viscous materials are important operations.

The Bros steam generators are available in fully automatic and manually operated models. Both models are of the two-pass design, with 1½-inch tubes for faster steaming. Automatic models have a fully automatic on-off-type burner for operation with No. 1 or No. 2 fuel oil. The blower, fuel-oil pump, motor, and electric controls are integral parts of the burner assembly. A Minneapolis Honeywell Pressuretrol turns the burner on or off in response to steam pressure.

Safety controls consist of a high-pressure shut-off and a low-water cut-off, both incorporated in the Magnetrol water column and pump control. The flame failure cut-off uses a photocell as the sensing unit. The feed-water control is automatic and operates only when feed water is needed.

An exclusive Bros engineering feature is said to give superior boiler performance on both the automatic and manually operated models. A unique steam separator removes water from the steam, with the result that hotter, dryer steam is produced and boiler scale and sediment are cut down.

Each of the burner nozzles may be operated separately or in any combination. Nozzles may also be completely removed from the burner when necessary for cleaning, replacing, or inspection.

For further information write to the Wm. Bros Boiler & Mfg. Co., 1057 10th Ave. S. E., Minneapolis 14, Minn., or use the Request Card that is bound in at page 18 of this issue. Circle No. 47.

Hydraulic system starts diesel units

■ A new hydraulic starting system for diesel engines has been announced by Aeroproducts Operations, Allison Division of General Motors. Called the Hydrostarter, the system consists of a hydraulic motor, piston-type accumulator, engine-driven pump, reservoir, and a manual pump.

Specially engineered to operate in remote installations where cold weather and frequent periods of equipment inactivity can be detrimental to conventional electrical starting equipment, the Hydrostarter needs no outside source of energy. After the accumulator has been loaded and sealed with an inert gas, an engine-driven pump maintains pressure and the manual pump permits emergency recharging.

The starter is said to eliminate the need for heavy-duty electrical systems. The compact motor extends slightly more than 9 inches from the engine flywheel housing, and can be installed by the average mechanic. It can be coupled to practically all diesel engines up to 300 horsepower in the same way as a conventional electric starter. It is recommended for use on engines operating cranes, winches, shovels, draglines, trucks, tractors, graders, rollers, etc.

For further information write to Aeroproducts Operations, Allison Division, General Motors Corp., Municipal Airport, Dayton, Ohio, or use the Request Card at page 18. Circle No. 30.

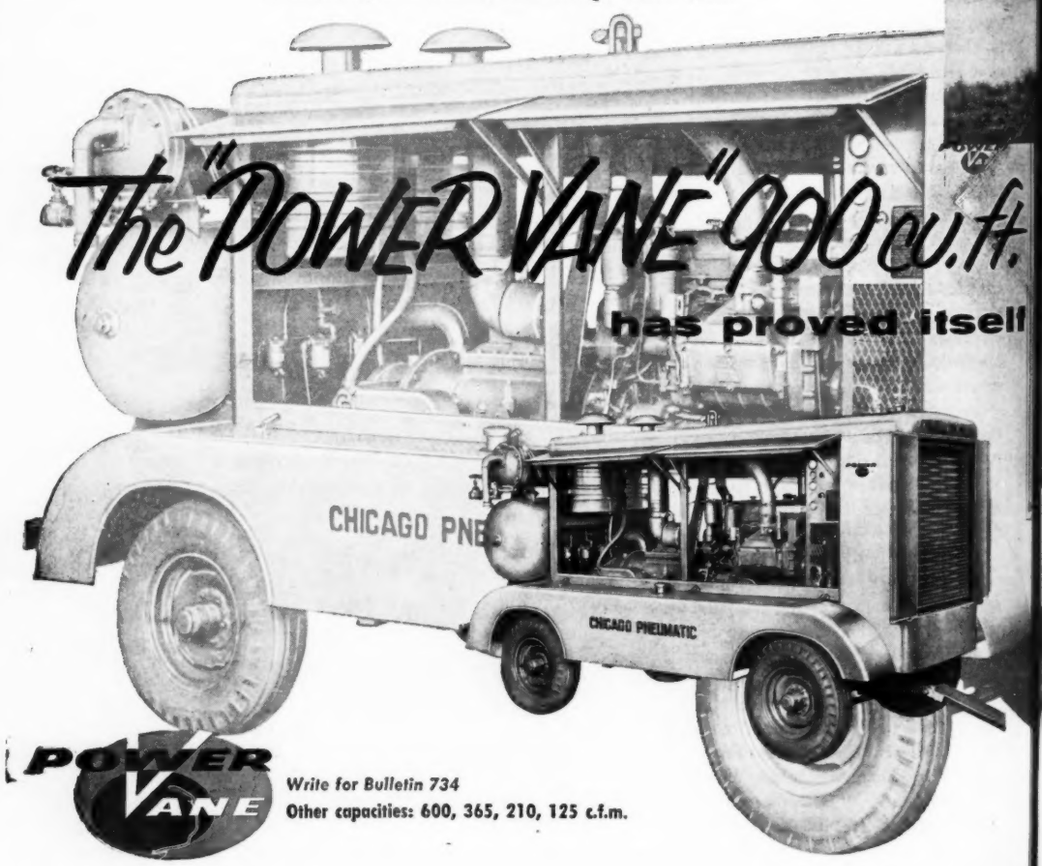
"Power Vane" Rotaries furnish steady, dependable air for caisson jetting

For Caisson Jetting – as demanding a job as you can hand a compressor – there's nothing that approaches the performance of a diesel driven "Power Vane" 900. With its large capacity you can depend on it for the sustained pressure required for low-cost jetting.

For Rock Drilling – A "Power Vane" 900 will run three 4-inch wagon drills simultaneously with peak performance.

For Pile Driving – "Power Vane" 900 provides the large volume of air needed for pile driving, pipe line testing and other "high demand" air jobs.

For Economy – a compact 900 cu. ft. portable unit affords a considerable reduction in attendance, maintenance and transportation costs.



Write for Bulletin 734

Other capacities: 600, 365, 210, 125 c.f.m.

The Hanson Model 654 excavator is a rugged machine built for top performance under any conditions.

Heavy-duty excavator for year-round work

■ The new Hanson Model 654 excavator, a crawler-mounted 12-ton-capacity crane, is reported to have the ruggedness and stamina to withstand the most severe winter conditions. Built of all-welded alloy steel, the 654 is said to be a heavy-duty machine designed for top performance under any conditions.

One of the features of this model is the independent power-controlled boom hoist, said to be particularly advantageous for steel erection or for any type of crane work where fast booming in either direction or pinpoint spotting is a requirement. All main shafts and drums are mounted on antifriction bearings with booster-controlled mechanical clutches of the internal-expansion type. A 30-inch crawler tread is standard, and air-controlled steering through a differential on the lower propel shaft assures positive and accurate crawler control at all times. Gasoline or diesel power is optional.

The Model 654 excavator will handle any bucket equipment of ¾-yard capacity.

For further information write to The Hanson Clutch & Machinery Co., 2000 Miami St., Tiffin, Ohio, or use the Request Card at page 18. Circle No. 45.

Chemical in pellet form speeds removal of ice

■ The hand labor involved in clearing sidewalks, driveways, steps, loading docks, and other areas where ice presents a hazard or working obstacle to men and machines may be eliminated with a product manufactured by Walton-March, 1935 Sheridan Road, Highland Park, Ill.

Ice-Foe, a chemical preparation available in the form of pellets, is said to have a melting capacity up to 30 times greater than that of salt. Sprinkled on the area in handfuls, the pellets reportedly create heat which melts the ice and then leaves no residue. The chemical is said to be nontoxic and nondamaging to vegetation, concrete, or asphalt.

Ice-Foe is available in 10, 25, and 100-pound containers.

For further information write to the company, or use the Request Card at page 18. Circle No. 92.

Work-site housing

■ A folder on the Morrison-International Campcar, a mobile unit that will house workmen at the construction site in all kinds of weather, is available from the Morrison Railway Supply Corp., 1437 Bailey Ave., Buffalo 12, N. Y. Dining, sleeping, and recreation units and combinations to accommodate from two to more than 100 men are described.

A special feature of the Campcar is that it is a completely self-contained unit which does not depend on any trailer-camp facilities. The aluminum-paneled body of the car is insulated to withstand extreme temperatures, making it especially applicable to winter construction work.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 52.

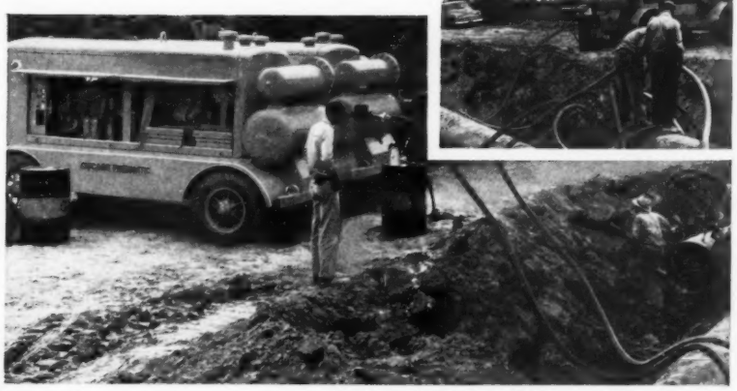
Winter starting fluid

■ A pocket-size folder which summarizes the advantages of Spray starting fluid is available from the Spray Starting Fluid Co., P. O. Box 584, Camden, N. J. The folder tells how and why this product unlocks gasoline and diesel engines from the grip of cold weather, and gives the simple instructions needed for its use.

To obtain this folder write to the company, or use the Request Card at page 18. Circle No. 71.

ROTARY COMPRESSOR

on tough jobs



A pair of "Power Vane" Rotaries supplying 1800 cu. ft were moved in for quick testing on this pipe line job.

Chicago Pneumatic 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

For more facts, use Reader-Reply Card opposite page 18 and circle No. 255

This all-weather cab for the Ottawa Hydra-Hammer protects the operator from the elements during winter work.

Mobile concrete-breaker has all-weather cab

■ Ottawa Steel now offers its Hydra-Hammer equipped with an all-weather cab designed to further increase operator comfort and minimize operator fatigue during the winter months.

This new feature is said to offer a definite advantage in such applications as breaking concrete, cutting asphalt, and tamping backfill. It protects the driver from wind, rain, sleet, and snow, increasing workability time of both operator and machine.

This all-steel cab has safety plate-glass windows which permit 360-degree vision. The cab is 5 feet 2 inches high, 4 feet long, and 3 feet 1 inch wide. According to the manufacturer, it can be set up quickly by unskilled workers. Designed to fit all models of the Ottawa Hydra-Hammer, it is available for machines already in the field, as well as for new models from the factory.

For further information write to Ottawa Steel, Division of L. A. Young Spring & Wire Corp., Ottawa 60, Kans., or use the Request Card at page 18. Circle No. 31.

Winter concreting

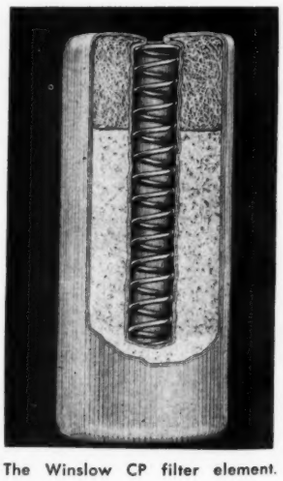
■ Tips on cold-weather concreting are set forth on a heavy-stock sheet available from Master Builders Co. These explain the use of plain concrete, concrete with calcium chloride added, and high-early-strength concrete, and the temperatures recommended for each in the mixing, placing, and setting stages. A handy temperature control chart is printed on the reverse side.

To obtain this sheet write to Master Builders Co., 7016 Euclid Ave., Cleveland 3, Ohio, or use the Request Card at page 18. Circle No. 98.

Cold oil flows freely through new filter unit

■ A replaceable oil-filter element which is said to provide full-flow filtering under abnormally cold weather conditions is offered by Winslow Engineering Co., 4069 Hollis St., Oakland 8, Calif. The unit is reported to filter out all dangerous particles at the same time.

The Winslow CP element contains four filtering materials, including the cloth which covers the unit. The major portion of the filtering media is a predetermined mixture of specially-graded cotton thread and wood fiber. A coarse filtering agent occupies the remainder of the element.



The Winslow CP filter element.

According to the manufacturer, these filtering agents are packed in proper proportion to assure definite and predictable flow and pressure characteristics. Even when oil is cold and viscous, it is reported that the element removes all particles dangerous to the engine while keeping the oil flowing freely through the filter.

For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 27.

INCREASING FOOTAGE OF DIAMOND CORE DRILLS

with Stoody Acetylene Tube Borium

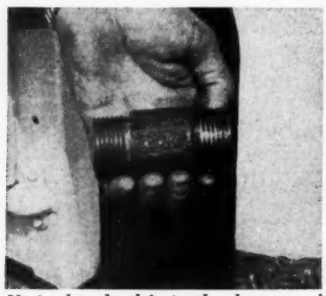
When we think of diamond studded tools, hard-facing seems unnecessary... after all, the diamond is nature's hardest, most wear resistant substance. Although core bits and their connecting reamers are set with industrial diamonds for extending overall life, the barrels and flutes don't benefit by these inserts. Here's how one operator increased footage of sampling drills from 400 or 500 feet to between 2000 and 3000 feet.

After making comparative tests of several hard-facing materials, 30-40 Acetylene Tube Borium (containing tungsten carbide particles) was selected because of its excellent wear resistance. Reamer bodies were hard-faced with a series of parallel longitudinal beads, the deposits extending around those areas containing the diamond inserts.

Since walls of the core barrels are thinner at each end because of internal threads, wear weakens these areas quicker than the remaining barrel. By hard-facing back 6" from each end and adding extra protection over the threaded areas overall barrel life is equalized. When the hard metal is gone the entire barrel has delivered maximum service. Flutes, attaching core barrels to drill rods, are hard-faced on outside diameters.

Straight edge of saw blade shows how hard-faced end of barrel has held its size.

Stoody Hard-Facing Alloys afford maximum protection to all wearing equipment. For recommended alloys and application technique on your specific wear problems refer to the Stoody Hard-Facing Guidebook. Your Stoody dealer has a copy for you or write direct.



Notice how hard-facing beads surround but do not cover diamond inserts.

STOODY COMPANY

11936 East Slauson Avenue

Whittier, California

For more facts, use Reader-Reply Card opposite page 18 and circle No. 256

The new sub-zero grade of Snow-Rem snowplow wax can be applied on the job in extreme weather conditions.

BLOCKS OF FROZEN ground cut by the Blackhawk Trench Hog at left are lifted out by means of a crane arm mounted on the rear of a Ford tractor. The high-carbon steel cutters on the Trench Hog cut clear through the frozen ground, so that when the blocks have been lifted out, the frost-free ground underneath is accessible for rapid excavation by ordinary methods. For further information write to the Arps Corp., New Holstein, Wis., or use the Request Card at page 18. Circle No. 40.

Improved plow wax aids snow removal

■ Snow-Rem snowplow wax is now available in a new formula designed for application in subzero temperatures, according to an announcement by Speco, Inc., 7308 Associate Ave., Cleveland 9, Ohio. New fast-acting nonfreezing drying agents are said to permit on-the-job use of this preparation under the most adverse weather conditions.

Suitable for both brush and spray application, Snow-Rem is reported to eliminate the time and labor involved in coating snowplow blades with preparations which must be applied indoors at normal temperatures. Its use on plow blades, moldboards, and wings is said to increase daily plow mileage by as much as 30 per cent, since the snow slides easily and rapidly off the waxed surface.

For further information write to the company, or use the Request Card at page 18. Circle No. 55.

Data on engine starter

■ A bulletin explaining the principle, operation, and advantages of the Ampco-Sinclair engine starter, an applicator which meters air and starting fluid to cold engines in just the right proportion, is available from the manufacturers.

Photographs, diagrams, charts, and a breakdown of parts fully describe this cold-weather starting device, said to provide quick starting of gasoline and diesel engines in temperatures as low as 40 degrees below zero. Complete instructions for mounting and operating the unit are included.

To obtain this bulletin write either to Technical Service Division, Sinclair Refining Co., 600 Fifth Ave., New York 20, N. Y., or to Automotive & Marine Products Corp., 87 Harvard Ave., Boston 34, Mass., or use the Request Card at page 18. Circle No. 127.

Dewey & Almy news

Sam D. Burks, a former member of the U. S. Army Corps of Engineers, has joined the Dewey & Almy Chemical Co., Cambridge Mass., as sales director of construction specialties products.

A concrete specialist, Burks directed the concrete design and temperature-control studies for the Pine Flat Dam in California.

More Strength
with Autocar . . .
Nut and Bolt Construction

- **Higher strength, heat treated material used.**
- **Bolts are made to fill holes exactly to assure snug fit.**
- **Nuts and bolts are assembled with heat-treated lock washers under both head and nut for a permanent, tight installation.**
- **Nuts and bolts are fundamental to easy, low-cost maintenance.**

. . . Means more work, longer life, lower cost on the job

HAVE you seen the Autocar "Nut and Bolt" demonstration? You have if you've seen Autocars on the job—on the tough jobs, everywhere!

Autocar Quality starts with "Nut and Bolt" construction . . . the use of nuts and bolts in the assembly of all Autocar Trucks. It's typical of the way Autocars are quality engineered to exact operator requirements . . . for more work . . . longer life.

Find out how Autocar cuts transportation costs . . . for years. See your Autocar representative without delay.

AUTOCAR TRUCKS

AUTOCAR DIVISION OF THE WHITE MOTOR COMPANY, EXTON, PA.

AUTOCAR DIVISION
The White Motor Company, Exton, Pa.

Send me facts about Autocar "Nut and Bolt" Construction

Name_____

Position_____

Firm_____

City_____ Zone____ State_____

23L

For more facts, use Reader-Reply Card opposite page 18 and circle No. 257

Rugged and frozen terrain in the arctic is hard on tracks of tractors bulldozing over rocks and boulders. Special snow-type track and drive sprockets keep snow from packing in the tracks.

U. S. Army Corps of Engineers Photos

Winter Work

Special care keeps equipment rollin

In the Eastern Ocean District at Thule, Greenland, it is absolutely essential that construction machinery be in top operating condition at all times, and observance of the U. S. Army Corps of Engineers' standard maintenance practices keeps it ready.

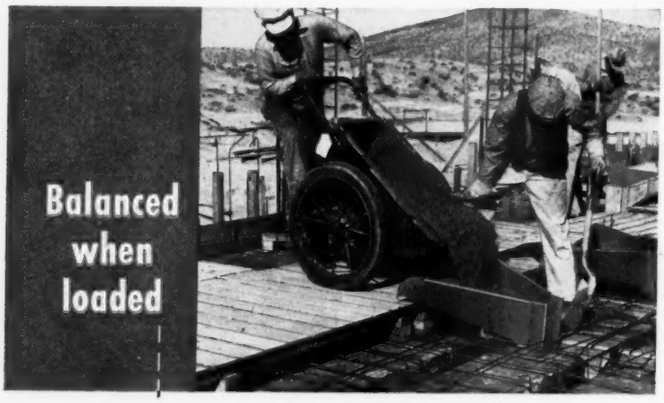
Equipment upkeep in the Arctic presents a number of problems, some of which are fairly easy to overcome. But there were others which stumped some of the foremost maintenance men before they were solved. All maintenance problems in the Arctic stem from one common source—the climate. The extreme cold affects everything—steel, operating mechanisms, engines—and all work and all maintenance procedures have to take this into account.

Cold affects steel

Extremely cold temperatures will, over a long period, have a definite effect on steel, making the metal tend to crystallize and become brittle. For this reason it is advisable to keep crane boom lengths as short as requirements permit. At Thule, there was a large amount of breakage of backhoe booms and dipper arms, axle shafts on all types of trucks, and track pads on tractors. In the last instance, excessive breakage was caused when tractors were operated over rock and boulders on frozen ground.

It is advisable to have standard, or narrower, pads on all track-type equipment working in soil. Generally, the terrain in northern Greenland is such that wide swamp-type pads on crawler equipment are not necessary. For operations on the Greenland Ice Cap with crawler-type tractors and other vehicles such as weasels, the wide track has an advantage in increasing flotation. Packing of snow in the tracks, a constant menace, can be avoided by using special snow-type track and drive sprockets.

GAR-BRO CONCRETE CARTS INSURE *Full Capacity* LOADS



HANDLES 30% MORE load with half the effort.

LIGHTWEIGHT—¼ to ⅓ lighter than ordinary carts.

ROCKER DUMP type carts are available for handling dry concrete.

HIGH TRAY permits hauling lumber, forms and other materials.

THREE MODELS: Narrow 30" width, 6 cu. ft. cart for easy handling and narrow runways. Standard 35" width, 6 to 8 cu. ft. carts. See your Gar-Bro dealer.

GAR-BRO MANUFACTURING CO • Los Angeles, Calif. • Peoria, Ill.
General Offices: 2415 E. Washington Blvd., Los Angeles 21, California

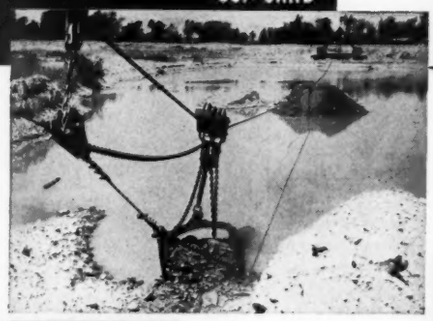
Ask your dealer for the Gar-Bro Manual . . .

GAR-BRO *the world's most complete line of* Concrete Handling Equipment

For more facts, use Reader-Reply Card opposite page 18 and circle No. 258

the pit: *tough*... 70% ROCK 30% SAND

the machine: Sauerman 2½-cu. yd. slackline cableway excavator



the result:

"..a full bucket every trip"

Another actual field report—Helena Sand & Gravel Co., of Helena, Montana, switched to this Sauerman equipment in 1946. It's been in operation since then . . . successfully performing difficult, underwater excavation of rock and colloidal sand where other equipment had failed.

Sauerman Slackline Cableways span water, bogs or pits . . . reach far, dig deep, lift and carry loads to hoppers or cone piles. However tough the pit, Sauerman equipment brings in a good load every trip.

With a Sauerman Slackline Cableway, one man—in safe position—operates a single machine . . . does the complete job, quickly, efficiently, economically! Sauerman Slackline Cableways range from 1/3 to 3 1/2 cu. yds.—span distances up to 1,000 feet . . . handle such materials as sand, gravel, clay, peat, ore and rock.

Write today for more information, including these handy field reports and catalog:

FR-216 Easy Excavating in a Tough Pit
FR-213 Cleaning Ponds Without Draining
FR-102 Digging Gravel From a River
Catalog C Sauerman Slackline Cableways

SAUERMAN BROS. INC.
616 S. 28th AVE., BELLWOOD, ILL.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 259

ment olling on Arctic project

by COL. MORTON SOLOMON, district engineer,
Eastern Ocean District, U. S. Army Corps of Engineers

Grading equipment is blocked up when it is stored for short periods so that flat spots do not develop on tires. In summer months, idle equipment is moved regularly because of surface thaw and re-freezing.

Equipment operation

The use of backhoes is limited, and in all cases the natural ground has to be blasted first. Much more earth had to be removed by this method, but it proved faster in the end.

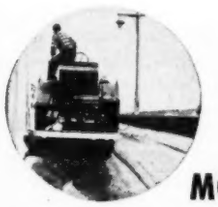
Dragline operation in the Arctic permafrost, while very limited, is still possible and has advantages under certain circumstances. The ideal place to consider dragline operation was in the riverbeds where the gravel is loose and the active layer thawed.

A dragline with 3-yard bucket, used at Thule for this type of operation, dug to a depth of 4 feet in natural ground before striking solid frozen material. The large bucket was an advantage because of its weight, and its ability to work a wide area. It is doubtful if anything smaller than a 1½-yard dragline bucket would work satisfactorily. In all cases, wear on teeth and buckets was excessive because of gravel conditions.

There is always a considerable amount of discussion and difference of opinion about the advantages and disadvantages of hydraulic air, vacuumatic, and straight mechanically-operated clutches and controls for shovels and cranes. Air and vacuumatic-type clutches and controls involve the use of air lines and cylinders and, as there is some condensation because of air pressure, lines are apt to freeze in the extreme cold of the Arctic.

Weather does not materially affect hydraulic controls. The only disadvantage is in the possibility of occasional breakage of hoses and oil lines. All these controls also possess the advantage of being less fatiguing for the operator, since all he has to do is manipulate the small levers. But in doing so, he loses the feel of applying power which is essential when work is being done under severe conditions.

Air and hydraulic-type controls present a maintenance problem, since



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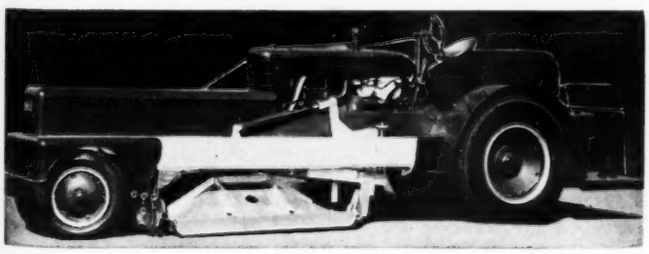
RUNS THE
MONATCO HEATER-PLANER

With only one operator, this machine renews the asphalt surface on Roads, Streets, Highways and Airport Runways. Heats and planes in one operation. Leaves a perfectly conditioned, raw, clean surface—the same as on newly laid pavement. Operates at the unbelievably low cost, reported by many users on actual jobs, of *less than 10¢ per square yard.*

Write for complete specifications and cost operating data.



(Covered by U. S. Patent No. 2,705,906)

No Incineration of Asphalt
No Smoke
2,000° F. under the Hood
No Special Skill Needed to Operate

Manufactured by MONATCO MFG. CORPORATION
1401 WOODLAND, KANSAS CITY, MISSOURI
Ask us about a few choice distributorships still available
For more facts, use Reader-Reply Card opposite page 18 and circle No. 260

Scottie "Swami" McBlock Sees a McKISSICK in your Future

Heavy Duty SNATCH BLOCK

Is built for a LONG LIFE

All steel construction with 6"-10" diameter steel sheaves, 2" diameter center pins.

Drop forged steel swivel hooks, yokes or shackles. Quickly interchangeable.

High speed bronze bushings or Hy-load roller bearings.

McKISSICK

McKISSICK PRODUCTS CORPORATION
Box 2496 — Tulsa, Oklahoma

For more facts, use Reader-Reply Card opposite page 18 and circle No. 261

they require stocks of parts to be carried, especially in the Arctic where work is done far from sources of supply.

Straight mechanical controls with boosters is an original design and has been improved through the years almost to the point of perfection. It affords the operator a feel of the load and instantaneous control at all times. Such straight mechanical control also requires no extensive maintenance. Today, many leading shovel and crane builders are continuing to install these controls on their machines.

Mechanically-operated clutch controls have a definite edge over air and hydraulic controls in Arctic operations. Electric "magnetorque" clutches work successfully with a minimum of trouble.

A Caterpillar diesel tractor plows snow under floodlights so that work can continue even through the darkness of the Arctic winter.

The use of water and sewage tank trucks was successful in the Arctic, provided proper precautions were taken. All tanks were insulated, and had electric immersion-type heaters or diesel burners with flues inside the tanks. At Thule, the external pumps were originally wrapped with insulating material. This proved unsatisfactory, and most of the pumps eventually froze. But the difficulty was overcome by boxing in the whole assembly and running the engine exhaust pipe through the box.

Field and shop maintenance

Repair-shop facilities at Thule are first-rate for a construction job. The shops are well equipped, in adequate buildings, and are operated in accordance with good stateside practices. Maintenance facilities were located in buildings erected during the construction program, and as the project was completed, the buildings were transferred to the air force.

Field maintenance on equipment in temperatures of plus 32 degrees to minus 20 degrees creates a serious problem for mechanics. In this situation, tarps and emergency heaters are useful, and maintenance trucks with enclosed cabs and good heaters provide a shelter, when needed, for field repair crews. In fact, it is essential that construction equipment be provided with enclosed cabs whenever possible for the protection of operators, especially in temperatures which dip below freezing. Cabs should also be equipped with heaters and defrosters.

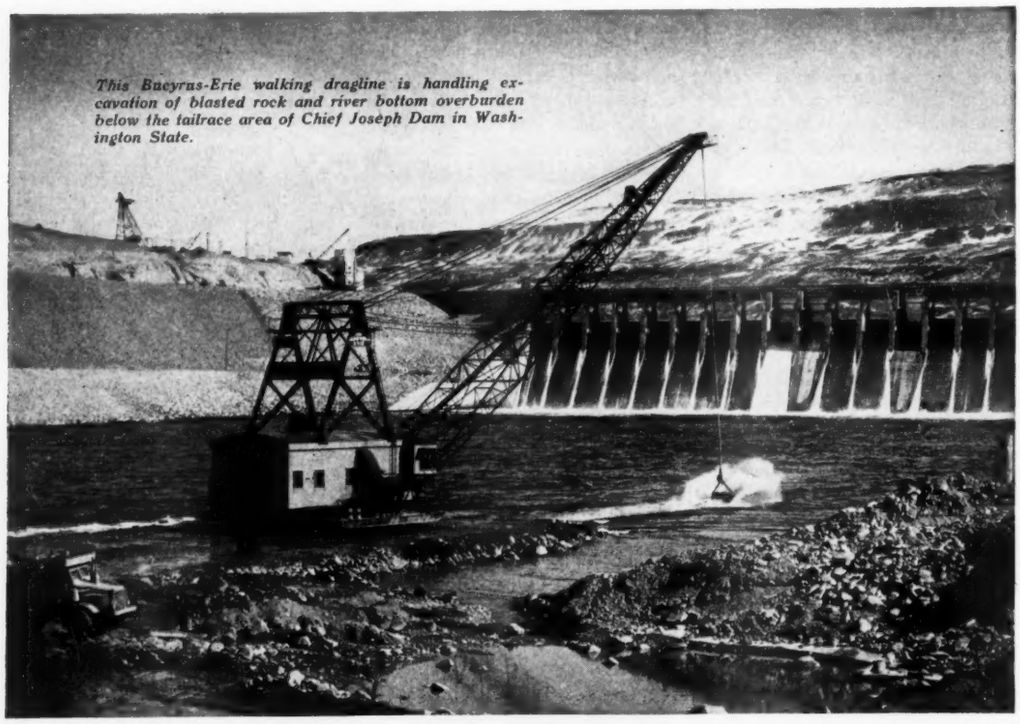
Small boom trucks with winches have proved very valuable for field maintenance. Military-type ordnance shop trucks, with fully enclosed metal bodies, have also proved excellent as mobile repair shops, parts and supply trucks, and shelter for the repair crews.

Maintaining spare parts and replacement stocks in the Arctic presents two big problems. The distance from source of supply and transportation makes it necessary for stocks to run at least 25 per cent in excess, and careful planning is required to have parts when needed and to take advantage of surface shipping.

Equipment storage

Open storage of equipment in the Arctic presents no serious problem if machines are handled properly. Because equipment is usually working until long after the active layer above the permafrost is again permanently frozen in the fall, there is no danger of freezing in if necessary precautions are observed. Where equipment is idle during the summer months, it must be moved regularly because of surface thaw and subsequent freezing.

Rubber-tire equipment is blocked up to avoid flat spots on the tires.



This Bucyrus-Erie walking dragline is handling excavation of blasted rock and river bottom overburden below the tailrace area of Chief Joseph Dam in Washington State.

Want to move really BIG yardages . . . economically?

PUT A BUCYRUS-ERIE WALKING DRAGLINE ON YOUR JOB

When you're faced with a job that calls for really big yardages, you'll be ahead by putting a Bucyrus-Erie walking dragline to work. It will give you the big capacity you need to get the job done fast, the performance that holds costs in line, the dependability that makes the most of every hour of working time.

You'll find the machine you need in the Bucyrus-Erie line — the world's largest selection of walking draglines. Each model offers features that have made these machines outstanding performers for years — such as simple main machinery for year-after-year dependability; exclusive walking mechanism for smooth, sure moves; front-end design that combines strength with light weight; Ward Leonard variable-voltage control on electric-powered models for fast acceleration and deceleration.

Let us tell you more about how Bucyrus-Erie walking draglines put you out in front on the big-yardage jobs. Bucket capacities start at 4-cu. yds. 57L55

BUCYRUS ERIE
South Milwaukee Wisconsin
1880 75 1955
YEARS OF SERVICE to Men Who Shape the Earth

For more facts, use Reader-Reply Card opposite page 18 and circle No. 262

Since high winds are prevalent, it is necessary that all cabs, windows, and other openings be securely closed to prevent dust and snow from blowing in. Salt water, damaging to construction machinery because it gives rise to rust, presented no big problem at Thule, even though equipment is stored within 300 yards of the bay. It seems, generally, that north of the Arctic Circle, rust problems are greatly reduced.

Like all construction jobs, the work at Thule had plenty of tire troubles. But a tire shop, capable of making repairs to the largest tires, kept the trucks rolling. The use of synthetic rubber tires, and especially inner tubes, is not recommended for Arctic use. Experience at Thule proved that synthetic tubes are very unsatisfactory. In some cases, tubes were known to blow out in one day's operation.

Special motor care

Temperatures of minus 10 degrees and below have a serious effect on internal combustion engines when they are put in operation outside after having been shut off several hours or more. Crankcase oils congeal and cause severe strains on starting motors and batteries. In some cases it is necessary to pre-heat manifolds and oils in the crankcases. This is especially true of trucks equipped with diesel engines. Usually, about 15 minutes of heating the engine, using the flexible ducts, is enough to warm the crankcase oil and manifolds.

In view of the serious lubrication problems in the Arctic, the U. S. Army Corps of Engineers and Army Transportation Corps, along with all the principal oil companies, have been experimenting with lubricating oils and greases under all manner of conditions. Engine oil 5W, which is supposed to flow at minus 40 degrees, was observed to congeal into a solid mass at minus 20 degrees. Oil of this type caused severe damage to engines. It was also found that diesel fuel is not suitable for diluting oils. Kerosene, if available, is satisfactory.

Overcoming lubricating problems was one of common sense, good housekeeping, the purchase of good standard brands of oils, and regular organized and scheduled servicing of equipment. At Thule, central lubricating stations were strategically located to service rolling stock. Portable lubricating trucks with special Arctic bodies and equipment were also used, and they proved very satisfactory. Accurate records with mandatory servicing items were kept to make sure the program was followed according to schedule.

North of the Arctic Circle it is advisable to use a permanent type anti-freeze of 60 per cent compound to 40 per cent water. This was set up by the North Atlantic Constructors as a SOP (Standard Operating Procedure) at the very beginning and was carried out successfully. Before equipment was shipped from the United States, it was winterized. Anti-freeze was controlled by one department at Thule where solutions are mixed in one large central dis-

(Concluded on next page)

Most of the necessary servicing and repair work is done in Thule maintenance shops. Ford trucks lined up at left are being serviced with anti-freeze.

Now–Two Heaters for the price of One!

. . . from gasoline engine . . . to electric motor in 20 minutes

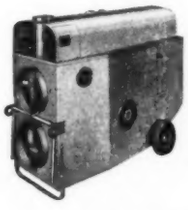
NEW

HERMAN NELSON "UTILITY" Portable Air Heater

The *first* portable heater that offers interchangeable power plants . . . motor drive where you have electric current, or gasoline engine for remote job sites. Gives the *most* heat for the *least* fuel of any heater.

The "Utility" will operate overnight without re-fueling. Also operates with either gasoline or fuel oils, without need of adjustments. It may be used with or without ducts, and with or without venting, depending on job or location. Engineered for utmost safety, with automatic overheat cut-off, and safety trip valve that shuts off fuel when the prime mover stops.

The simplest of all portable heaters to operate and care for, the "Utility" has a manual heat control, and self-cleaning burner. 75,000 to 425,000 BTU capacity. Write for free literature on the *complete new* Herman Nelson line!



Ask about the complete line!

"De Luxe" Model
Oil Fired. Electric motor powered. 280– 450,000 BTU capacity. Completely automatic operation.

"Thrifty" Model
Oil Fired. Electric motor powered. 50– 170,000 BTU capacity. New, low price!

AAF — HERMAN NELSON
Best Known Name In
PORTABLE AIR HEATERS
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Please rush complete literature on portable heaters. Also send me your monthly Weather Forecast Chart, at no cost or obligation to me.

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COMPANY_____
ADDRESS_____
CITY_____ ZONE____ STATE_____

For more facts, use Reader-Reply Card opposite page 18 and circle No. 263

pensing tank, assuring a proper mixture at all times. A supply of approximately 50,000 gallons of antifreeze compound was procured for shipment to the site.

Maintenance and operation of construction equipment in the Arctic will always present problems. But experience gained at Thule and other bases in Greenland is adding information to that gained in previous research, and will help toward improving design and methods of operation. After using approximately 2,000 pieces of equipment in Greenland, the downtime on machinery was under 10 per cent at the close of operations in 1954. This remarkable record is a tribute to American workmen and machinery, and to the continued research of the U. S. Army. THE END

Portable heating unit warms the floor area

■ A portable heating unit which can be wheeled from one work zone to another and set in operation simply by plugging it into any 110-volt circuit outlet is offered by Mortemp Division of Mechanical Products Mfg. Co., 1727 First Ave. S., Seattle 4, Wash.

The Mortemp Model L heater is said to permit substantial savings in fuel because it heats only the work or material-storage area, discharging a blanket of heat at floor level. Heat is focused like a spotlight. Since there is no chimney, no fuel is dissipated in smoke or exhaust fumes. Ordinary stove oil is burned.

This heater is 58¾ inches high, 34½ inches deep, and 20 inches wide. Weight is only 250 pounds. Capacity of the Model L is 189,000 Btu.

The Mortemp Model L heater gives off a blanket of heat at floor level.

For further information write to the company, or use the Request Card at page 18. Circle No. 33.

Emergency equipment makes Arctic defense work safer for operators

Escape and emergency provisions are helping to make operators of tractor equipment as safe as possible in the below-zero temperatures near the Arctic Circle, where the U. S. and Canada are rushing work to completion on three layers of rubber-domed radar installations. Though the precise nature of the project has not been made public, it consists of three lines of radar stations—one just north of the Canadian population belt, another which cuts across the center of Canada, and a third, the DEW (Distant Early Warning) line, just inside the Arctic rim. This most outlying line, about 1,800 miles north of Chicago, is about three hours from the U. S. by bomber.

One of the special provisions on Caterpillar tractors on this project is an emergency escape hatch at the top of the cab, which allows an operator to get out of the cab quickly in case the tractor goes through the ice. Another is a rescue arrangement consisting of a C-frame extending to the rear of the machine and having an empty barrel attached to it by a wire cable. Should the tractor break through the ice, the barrel will float until a rescue party can spot the machine and haul it to the surface by means of the cable and C-frame.

An oscillating ice skate for bulldozer blades, permitting the blade to scrape snow off ice without cutting into the ice itself, special cabs with extra-powerful vibration-proof heaters, and special air-compressor attachments have also been provided for equipment by Caterpillar and its distributors.

Freeze-ups prevented on mobile housing units

■ A method of heating water and drain pipes in mobile construction offices and on-the-job crew quarters so as to prevent freeze-ups is announced by Pontiac Coach Co.

In the Pontiac system, all water is drained into one central pipe with its outlet under the bathroom, and all pressure pipes pass through the same area. This area is enclosed by steel plates and filled with spun glass insulation. The heat duct leading to the bathroom has a 2-inch opening through which hot air is blown into the enclosed area and around the water pipes. Thus the water being drained away is warmed, and kept warm by the heavy insulation until it leaves the coach.

For outside pipes, a simple heating arrangement plugged into the outside electrical outlet is said to do the trick. A heavy wire wound around the pipe uses very little current and reportedly keeps the outside pipes from freezing.

For further information write to the Pontiac Coach Co., 4615 Dixie Highway, Drayton Plains, Mich., or use the Request Card that is bound in at page 18 of this issue. Circle No. 113.

The JACKSON MULTIPLE VIBRATORY COMPACTOR

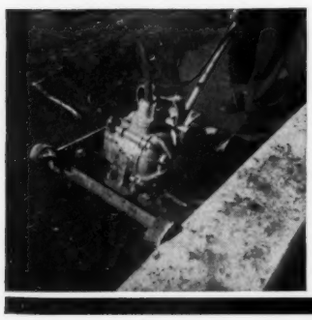
Used on the VAST MAJORITY of ... IMPORTANT ROAD-BUILDING JOBS!

On all of the new toll roads and on dozens of other highway and airport building projects JACKSON MULTIPLE COMPACTORS are the predominant medium for consolidating the granular soil sub-bases and the base courses of sand, gravel, rock or slag in waterbound and penetration macadam construction. They're also very extensively and successfully used on large area fills of various other types.

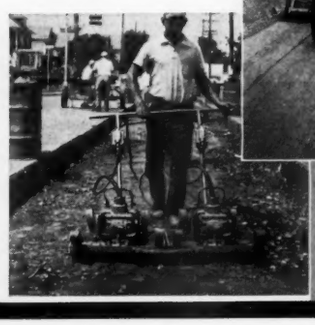
The popularity of this equipment has grown by leaps and bounds as one contractor after another discovered that with it specified densities can be achieved with greater uniformity, more economically and in less than one-half the time required with equipment of other types. Moreover, the Jackson Multiple will get into places larger equipment cannot reach, and for the really tight spots, individual compacting units may be detached, fitted with operating handles and operated like a standard, self-propelled manually guided compactor.

If you have any job requiring granular soil compaction, it will pay you to know specifically what Jackson Vibratory Compactors will do. See them at your nearby Jackson Distributor. Literature and Distributor's name on request.

Jackson manually-guided, self-propelled vibratory compactors deliver 4200 2-TON blows per minute. Achieve specified density of granular soils in layers as thick as 10" at the rate of 1800 sq. ft. per hr.



One man can readily operate a twin hook-up of Jackson Compactors, thereby virtually doubling production. Current is usually supplied by power plant on auto trailer (single or twin unit) with hydraulic pick-up of Compactor.



As indicated by the adjacent photos, the JACKSON MULTIPLE is readily adaptable to widening projects of any width.

JACKSON VIBRATORS, Inc.
LUDINGTON, MICHIGAN

For more facts, use Reader-Reply Card opposite page 18 and circle No. 264

Water is added to DuPont Zerex anti-freeze in preparing a pre-mixed solution for winter vehicle protection.

Pre-mix anti-freeze plan cuts service costs, time

■ Contractors and others who operate fleets or large spreads of machinery reportedly can save thousands of dollars in anti-freeze costs by using a "pre-mix" anti-freeze plan developed by E. I. du Pont de Nemours & Co.

Use of this system of winter maintenance is said to eliminate waste resulting from use of more than the required amount of anti-freeze, and to do away with the need for weekly hydrometer readings. The entire winter's supply of anti-freeze is mixed with water in proportions given by the anti-freeze manufacturer's chart. One hydrometer reading is taken to determine if the solution will provide the required amount of protection, and no other readings are required during the winter.

Prepared in sufficient amounts to last throughout the cold months, this pre-mixed solution may be easily stored in drums for ready use. Because it has been prepared exactly to vehicle requirements, there is no chance of over-protection—which means a waste of anti-freeze.

Zerone and Zerex anti-freeze are said to be particularly well suited to the pre-mix plan, according to the manufacturer, since both remain in solution once mixed with water.

For further information write to the Anti-Freeze Section, E. I. du Pont de Nemours & Co., Wilmington 98, Del., or use the Request Card at page 18. Circle No. 114.

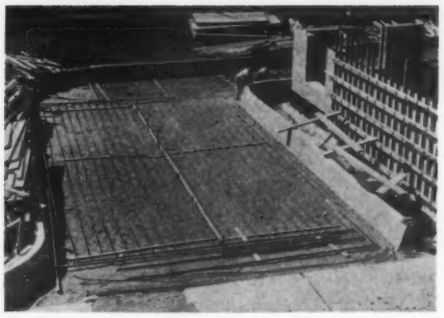
Tire traction plates

■ A mailing piece illustrating and describing its traction assembly for use on dual tires in snow, ice, mud, and other adverse surface conditions is available from The Tractioneer Co., 460 Wrigley Bldg., 410 N. Michigan Ave., Chicago 11, Ill.

Photographs explain the installation of Tractioneer Trac-Plates to give traction under the severest road and field conditions. The advantages of this assembly, particularly when used on heavy-construction rigs engaged in winter work, are clearly stated and illustrated.

To obtain this sheet write to the company, or use the Request Card at page 18. Circle No. 128.

For more facts, circle No. 265→



HAND SHOVELING or snowplow work is eliminated, not to mention the hazard presented by ice formation on walks and driveways, with the installation of Revere copper water tubes in snow-melting panels under areas like the driveway above. Featuring flexibility for easy installation, watertight joints, and high resistance to rust, rot or deterioration, these copper coils will melt ice and snow quickly and keep service-shop concrete floors warm enough for comfort throughout the winter. For further information write to Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N. Y., or use the Request Card at page 18. Circle No. 59.

Nearly 200 "EUCS" already at work on the St. Lawrence Seaway

Model 63TD "Euc" getting a heaped load of 20 cu. yds. at site of Long Sault Dam near Massena, N. Y.

Although work on the St. Lawrence Seaway and related New York Power Authority projects is just getting under way, close to 200 Euclids are already "digging in". They're helping build cofferdams, making diversion cuts, relocating highways and railroads, and preparing power house sites. Other "Eucs" are doing similar jobs on the Canadian side of the river.

One of the key projects in the whole Seaway program is construction of Long Sault Dam near Massena, N. Y., a joint venture sponsored by Walsh Construction Co. Others who have pooled their men and machines on this 7 million yard job are B. Perini & Sons Co., Morrison-Knudsen Co., Peter Kiewit Sons Co. and Utah Construction Co. . . . some of America's leading contractors. At present 50 "Eucs" are working on this one contract and others will be added as work progresses.

Eight of the Euclids are 22-ton Rear-Dumps with 300 h.p. engines and Torqmatic Drives. They were selected for this job because of their ability to haul big loads at fast travel speeds day in and day out . . . with less down time for servicing and repairs. That's the kind of performance that has made "Eucs" the preferred equipment for hauling heavy excavation on the toughest jobs everywhere . . . it's one of the important reasons why ***EUCLIDS are your best investment.***

Torqmatic Drive and 300 h.p. make this "Euc" a top performer. Torque Converter and semi-automatic transmission eliminate manual shifting—utilize full engine power at all times.

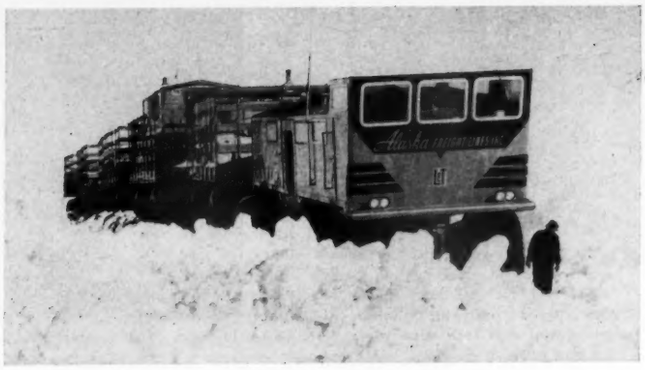
EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

EUCLID

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

GM GENERAL MOTORS



SOMETHING NEW in cross-country transportation is provided by the LeTourneau Freighter, a rubber-tire train that will travel over snow or rough terrain and into undeveloped areas affording a new means of freight travel. Each car in the train is self-propelled, and four-wheel drive plus flexibly mounted axles and high-flotation tires adapt the Freighter to rough, obstacle-ridden terrain. Above, one of the new transporters plows through heavy snow drifts to carry supplies to isolated radar stations along the coast of northern Alaska. For further information write to R. G. LeTourneau, Inc., 2399 S. MacArthur, Longview, Texas, or use the Request Card at page 18. Circle No. 116.

Performance

---is the PAY-OFF

in HENDRIX Dragline Buckets

A TYPE FOR
EVERY DIGGING PURPOSE

¼ to 40 Cubic Yards

Hendrix Lightweight Dragline Buckets

EXTRA PAYLOADS are the pay-off for the performance of Hendrix Dragline Buckets. Check with Hendrix users about actual job performance . . . yardage moved per day . . . maintenance and operating costs. Hendrix buckets are real money-makers because they *fill faster* . . . get a *full payload every trip* . . . and *dump cleaner* . . . all adding up to more payloads per hour . . . job after job!

All Hendrix Buckets available without perforations

HENDRIX MANUFACTURING CO., Inc.
MANSFIELD, LOUISIANA

For more facts, use Reader-Reply Card opposite page 18 and circle No. 266

Cold-weather concreting treated in new booklet

■ An instructive booklet which discusses all aspects of winter concrete-placing operations is available from the Lone Star Cement Corp. The booklet is well illustrated with photographs, charts, and tables.

Beginning with the most fundamental phases of winter concrete work, the publication explains mix proportions, quantities, and strength; comparative costs; and typical job practice. Detailed step-by-step instructions spell out the best procedures to follow in cold-weather concrete work.

Complete tables list proportions, quantities, and strength of various concrete mixes; approximate effect of temperatures on compressive strength of different mixes; and other variable factors such as exposure and setting time. The advantages of Lone Star cement and 'Incor' cement are explained.

To obtain the booklet, "Cold-Weather Concreting," write to the Lone Star Cement Corp., 100 Park Ave., New York 17, N. Y., or use the Request Card at page 18. Circle No. 26.

Hard-surfacing aids

■ Two forms for use as hard-surfacing guides in rebuilding and maintaining tractors and shovels during the winter maintenance period are available from the Rankin Mfg. Co., 616 Marengo Ave., Alhambra 2, Calif.

The process of building up tractor rails with Ranite Type A hard-surfacing, and details on building up sprockets, idlers, and rollers with Ranite Type B or B-X hard-surfacing is described in Form A6-1. Step-by-step instructions are given, and complete specifications for roller and idler build-up on Caterpillar, International, and Allis-Chalmers tractors are presented.

Form A-7 is a cardboard printed with template patterns for Caterpillar tractors. The template that fits a contractor's tractor may be cut out of the form and used to measure wear. The cardboard template also makes a good pattern to follow in cutting a permanent metal template.

To obtain these forms write to the company, or use the Request Card at page 18. Circle No. 18.

Power-takeoff joints

■ A bulletin describing its complete line of power-takeoff universal joints is available from Neapco Products, Inc. Well illustrated with diagrams, the booklet contains general data on these assembly parts and lists of available sizes of standard, short, and slip-length joints, as well as yokes and center assemblies.

The manufacturer stresses the fact that these joints are supplied with a sealed center assembly that keeps the lubricant in, despite low temperatures.

To obtain this bulletin write to Neapco Products, Inc., 807 South St., Pottstown, Pa., or use the Request Card at page 18. Circle No. 129.

The Clayton Summeraire space heater.

Portable space heater has 2,400-cfm capacity

■ A portable high-capacity space heater developed by the Clayton Mfg. Co., P. O. Box 550, El Monte, Calif., is that firm's answer to the problem of wintertime interruptions in construction schedules.

According to the manufacturer, the Summeraire heater sends out a stream of heated air at the rate of 2,400 cfm in the coldest weather. Suitable for both open or semi-enclosed areas, the unit has a capacity of 300,000 Btu per hour.

Recommended uses include heating areas where concrete is setting or curing, creating comfortable working conditions for construction crews, and thawing out cold equipment.

Three Summeraire models are available. Model H-300 is equipped with electric drive, and requires a source of 110-volt, 60-cycle ac for its operation. Model HM-300 is equipped with gasoline engine drive, requires no electricity for its operation, and can be used anywhere. Model HTC-300 is the same as H-300, except that it comes equipped with automatic thermostatic control. Btu output and fuel consumption rates are identical for all three models.

The heater burns 2.15 gallons of No. 1 or No. 2 fuel oil or kerosene per hour, and its 25-gallon fuel tank allows it to operate at full blast for 10 hours without refilling. Heat is discharged through a 14-inch-diameter outlet. Safety controls are a feature of the unit.

For further information write to the company, or use the Request Card at page 18. Circle No. 87.

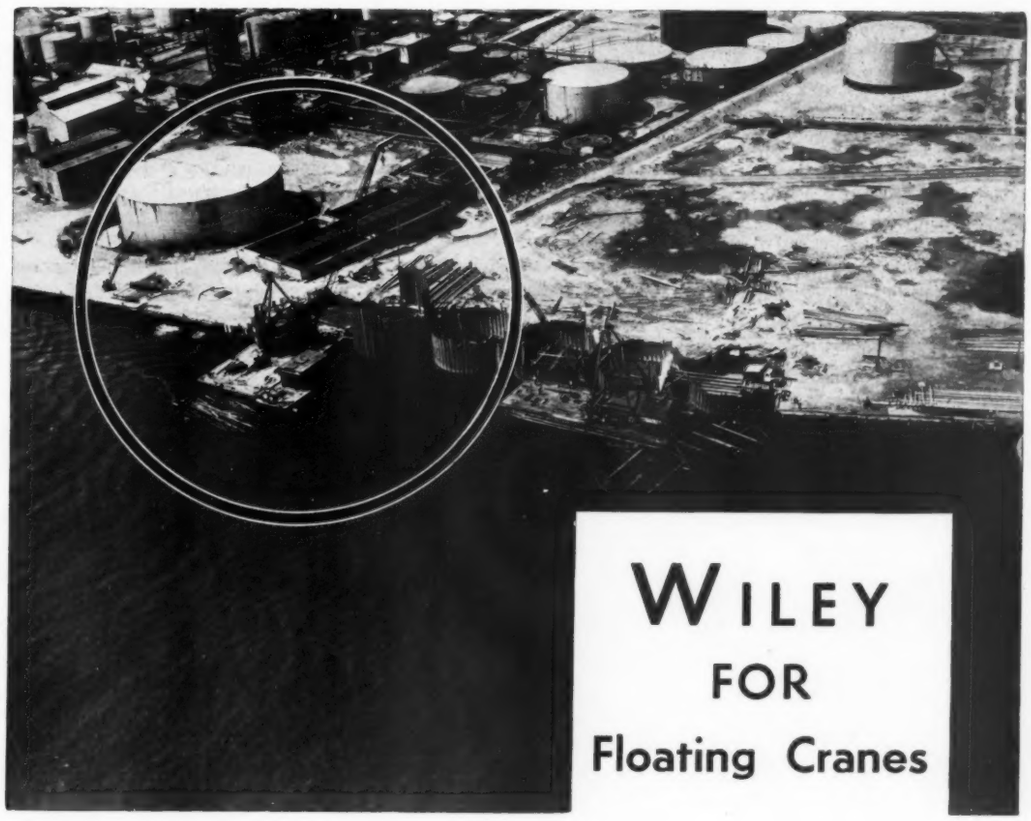
District representatives named by Koehring

Two new district representatives have been appointed by the Koehring Co., Milwaukee, Wis., manufacturer of heavy-duty construction machinery.

Howard H. Mobley will head the east-south-central territory, including Illinois, Indiana, Tennessee, Arkansas, Mississippi, and Kentucky.

The states of California, Arizona, Utah, and Nevada will be handled by William B. Thompson, who will make his headquarters in San Francisco, Calif. Both men will represent the subsidiary firms of C. S. Johnson Co., Champaign, Ill.; Kwik-Mix Co., Port Washington, Wis.; and the Parsons Co., Newton, Iowa; as well as the Koehring firm itself.

BUNDLED UP against winter temperatures which range down to 25 degrees below zero, this construction crew uses Atlas Copco jackhammers to break 225,000 yards of rock on a highway grading job in central Wyoming. Two 915-cfm compressors supply enough air for 15 of these lightweight hammers, which are kept operating in severest weather by injections of Tanner liquid gas into their air lines. The contractor estimates he saved 50 per cent of the initial cost of rock-drilling equipment by using the one-man-operated jackhammers. For further information write to Copco Pacific, Ltd., 930 Britton Ave., San Carlos, Calif., or use the Request Card at page 18. Circle No. 65.



Model 120 Wiley Floating Crane, owned and operated by Geo. W. Rogers Construction Corporation in service at Buck Terminal in New Jersey.

For dependable Floating Equipment discuss your requirements with Wiley Engineers.

WILEY MANUFACTURING COMPANY
BARIUM STEEL CORPORATION SUBSIDIARY

P. O. BOX 97, PORT DEPOSIT, MARYLAND PHONE: PORT DEPOSIT DRAKE 5-2111
For more facts, use Reader-Reply Card opposite page 18 and circle No. 267

Winter Work

Taconite plant construction goes ahead during winter

Lorain and Lima truck-cranes used Gar-Bro 1-yard buckets to place concrete. Portions of the canvas coverings, rolled back to admit the buckets from the top, are replaced as soon as concrete is poured, and heat is then supplied to the enclosure. *C&E Staff Photos*

Concrete construction during the cold of a northern Minnesota winter is not usually considered feasible, and is rarely attempted. Although most projects which cannot be put under cover by fall are closed down for the winter months, continuing operations on the taconite-processing plants being constructed by several large iron-mining companies indicate that construction can go on safely and profitably during the winter.

For a long time, mining engineers have known of the existence of the finely divided particles of iron ore in the very hard rock known as taconite, but only in recent years has it been proved that the particles can be freed from the rock. To take the process out of the laboratory, pilot plants have been set up and are not only producing high-grade iron ore from the taconite but producing it at a profit. The owners, therefore, lost no time in getting the full-scale plants under construction.

The value of the several construction projects on taconite-processing facilities is difficult to estimate. One company has suggested a total cost of $300 million for its setup, while another judged that its plant, mine and auxiliary construction would cost $160 million (see Processing Plant Is Built for Taconite Development, C&E, April, 1954, pg. 28). The total value of recently completed projects and those presently under contract or proposed for construction during the next year or two may reach $1 billion.

With investments of this size, much of it in plant equipment and machinery, owners recognized that speeding up plant construction, even at somewhat higher unit costs, would mean eventual financial gain. This is one of the principal reasons why concrete-construction work on several of these projects has proceded during the past few winters.

In addition to the covers and heat-

NOW! DOUBLE AND TRIPLE-DECK VIBRATING SCREENS are available on the

KOLMAN
COMPLETELY PORTABLE CONVEYOR-SCREEN PLANT
CONVEYOR • SCREEN • TRAP • FEEDER

Above, a 6′ x 36″ double-deck KOLMAN Vibrating Screen on a 50′ x 30″ Model 101 KOLMAN Conveyor. This plant is loading and sizing coal for Rasmussen Bros., Sheridan, Wyo. Note the conveyor supports these multiple-deck screens without additional bracing.

Multiple separate with a Portable Conveyor-Screen Plant? Yes, that's just what these owners of KOLMAN Plants have got! Two and three-deck Vibrating Screens are now available on the KOLMAN Model 101 Portable Conveyor. KOLMAN Screens, designed to eliminate all excess weight, are ideally adapted to conveyor installations. Their "Floating Action" delivers vigorous impact without transmission of vibrations to the conveyor.

This portable plant owned by Holm & Stebner, Powell, Wyoming, uses a 5′ x 32″ triple deck screen on a 50′ x 18″ Conveyor to make various sizes of sand and aggregate for oil field road building. Here, a spray bar has been added.

SEND this coupon for FREE literature

KOLMAN Manufacturing Co.

4922 West 12th St. Sioux Falls, S. D.

Please send ( ) Conveyor Bulletin No. 109, price of 19th. ( ) Vibrating Screen Bulletin No. 112 and price of ___″ x ___″ ( ) single ( ) double ( ) triple-deck.

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With either a double or triple-deck screen it is now possible to accurately make several sizes of material at one time. Ideal also for scalping out oversize and rejecting fines in a single operation. And all this on a *portable* outfit!

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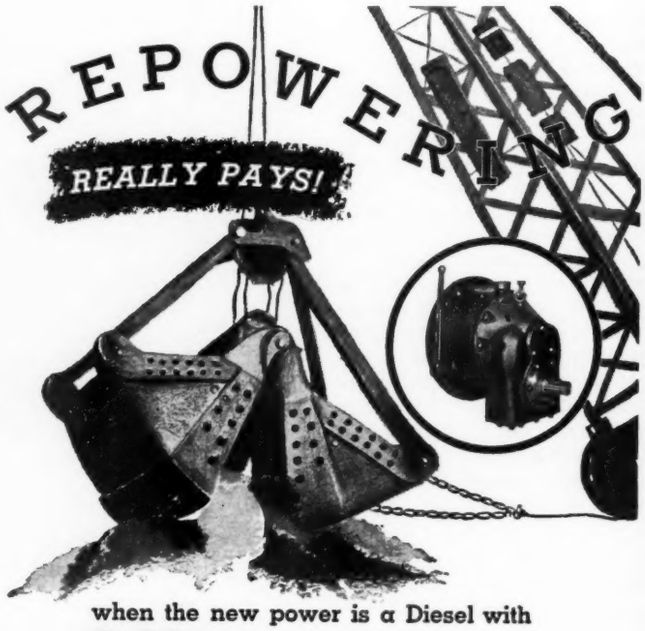

when the new power is a Diesel with

S-N REDUCTION GEARS

Operating cranes, pumps, shovels, draglines and similar heavy duty equipment can be mighty expensive when they're powered with ailing, old, slow speed gasoline engines with hard-to-get parts. Just switch to a modern high speed Diesel—plus a famous S-N Reduction Gear Unit—and keep your repairs and rebuilds to a minimum. That means less down time during the working season when it really hurts! And you save as much as fifty percent in fuel costs compared to a gasoline engine. Remember, S-N Reduction Gear Units insure smooth, full power from engine to load with maximum economy. Ideal for original equipment and all types of engines from 40 H. P. units to 755 H. P. giants. Range of reduction ratios—1.5:1 to 4:1.

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FOR NEARLY HALF A CENTURY
INDUSTRIAL DIVISION
THE SNOW-NABSTEDT GEAR CORP., HAMDEN, CONN.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 269

Safe, profitable cold-weather construction requires use of pipeline for concrete, enclosures, and heaters

ing equipment ordinarily used in cold-weather operations, a concrete pump was required for one job, a multimillion-dollar processing plant. A huge reinforced-concrete structure built on the side of a high rock bank, the plant measured more than 1,000 feet long and 250 feet wide.

Concrete work on this structure started late in the summer, and it was only good judgment to concentrate on the reinforced-concrete frame so that parts of the building could be closed in the winter. However, pouring the frame first meant that the large volumes of concrete in machine foundations and other elements within the building could not be placed by the conventional crane-and-bucket method. The hillside location made hand or motorized buggies impractical, and pumping was the logical solution.

A Rex Model 200 Pumpcrete, selected for the operation, was installed on a bench about 15 feet below the upper roadway level. A temporary shelter was built around the exposed sides of the pump, and steam lines ran into the enclosure from a nearby Bros portable steam generator. An opening at the top of the pump allowed transit-mix trucks to dump the concrete directly into the Pumpcrete hopper. Heated concrete, delivered to the pumpcrete in Rex 5-yard transit mixers mounted on International R-190 trucks, was pumped through 6-inch pipes to all parts of the structure at a rate of about 60 cubic yards per hour. The area in which the pour was being made was temporarily enclosed with plywood or canvas and heated by steam from one of several Bros portable steam generators or by Chinook Wind hot-air heaters fired with bottled gas.

While the Pumpcrete was placing

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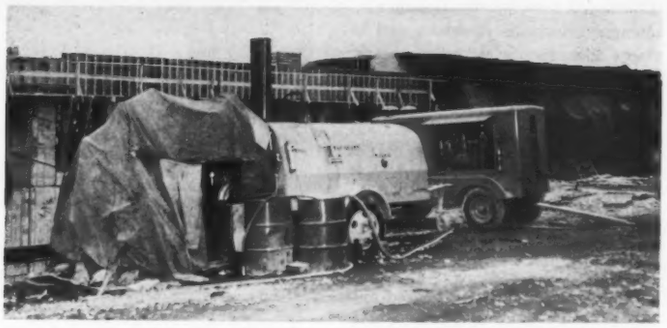
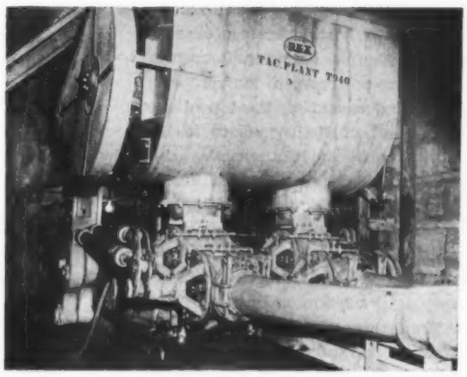


Heat is supplied to the enclosed portion of the building by this Bros portable steam generator. The fireman and the exposed parts of the controls are protected from the cold by canvas. The Chicago Pneumatic compressor, right, supplies air to vibrators.



A Rex Model 200 Pumpcrete inside the wood and canvas enclosure receives concrete from the mixer and pumps it to all parts of the project.

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HEAVY DUTY TRAILERS
for RUGGED WEAR OVER THE LONG HAUL

Fig. 221. 200-ton Birmingham Trailer Train, made especially for moving very large boilers. Custom designed trailer trains are one of our specialities.

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We carry a complete line of standard parts for all models of Birmingham Trailers. Our parts service is prompt and reliable.

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For more facts, use Reader-Reply Card opposite page 18 and circle No. 270

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(Continued from preceding page)
concrete inside the structure and in places inaccessible by other means, cranes and buckets continued making pours for the frame of the building and for other sections within their reach. Manitowoc 3900 crawler cranes and P&H 555 truck cranes using Gar-Bro 1 and 2-yard laydown buckets and 1-yard vertical buckets handled most of this concrete. To heat small or isolated pours, canvas was placed around the section being poured and one of the Chinook Wind heaters blew hot air under it. In larger areas, more elaborate enclosures were built and steam unit heaters were installed.

Concrete for this entire project was supplied by a Noble concrete plant set up nearby. Aggregate stockpiles at the plant were built up over a concrete recovery tunnel with steam mains laid on the top of the tunnel to supply live steam to the stockpiles. Steam heat was also supplied to the aggregate bins in the plant and to the mixing water. The entire plant with the exception of the concrete silos and elevators was enclosed with insulating sheathing as further protection against the cold.

Protecting radiators and motors from freezing and proper and adequate lubrication were cold-weather problems facing operators of tractors, trucks, shovels, and air compressors. It was necessary also for the workmen to find clothing that would be warm, but at the same time not so bulky as to impede movement.

Important also was the extra emphasis on safety during the winter period when hazards were greatest. Every man on the job continued to wear his hard hat with a warm liner inside. Special safety patrols kept the workmen constantly alert to the hazardous conditions and to the increased danger from ice, snow, and the extra clothing they wore.

The problem of adequate housing for workmen and their families became much more acute with winter weather. Trailers were banked to keep to keep out the wind, extra heating units installed when necessary, and water supplies protected against freezing. Field offices that would withstand the cold had heating plants and insulated walls and roofs.

In spite of the complications, work continued with little slowdown. Rock excavation proceeded almost at summer rates, and concrete production actually stepped up until 12,000 to 14,000 cubic yards were being placed each month. THE END

Production supervisor for Armco subsidiary

George B. Hutchinson has been appointed supervisor of production engineering for Armco Drainage & Metal Products, Inc., subsidiary of Armco Steel Corp., Middletown, Ohio. Coordination of production methods and procedures and direction of the experimental phases of production will be Mr. Hutchinson's responsibility. He will also recommend sites for new Armco Drainage plants.

Mr. Hutchinson has been with Armco since 1947.

The Insto-Hot Model 1415 salamander with No. 35 cylinder.

Salamander features regulator on heater

■ An addition to its line of Insto-Hot salamanders for winter construction work is now available from the Insto-Gas Corp., 1977 E. Woodbridge, Detroit 7, Mich. The new Model 1415 is equipped with a 100 per cent safety shutoff and pilot light.

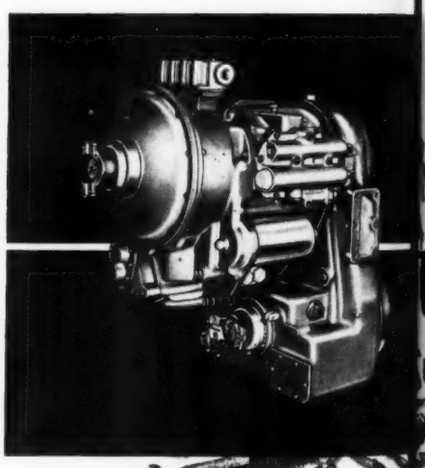
One of the many advantages claimed for the new unit is provided by a pressure regulator mounted on the salamander, which reportedly makes it unnecessary to have the cylinder nearby. Perfect operation with over 50 feet of hose is said to be assured. Also featured is advanced burner design that provides complete combustion and quiet operation.

Like the Insto-Hot 1405 and 1410 salamanders, the new No. 1415 has engineered heat distribution plus a secondary heat reflector skirt that throws heat upward. The new unit has a rating of 100,000 Btu per hour.

For further information write to the company, or use the Request Card at page 18. Circle No. 34.

A $5 or $10 food package sent for the assistance of a Korean orphan will make you feel good too. Address CARE, 600 Fifth Ave., New York, N. Y.

NOW TORQMATIC DRIVE for Shovel-Loaders



★ One Compact Unit

★ Speeds Job-Cycle Time

★ Cuts Maintenance Cost

★ Reduces Driver Fatigue

SHOVEL-LOADER manufacturers called on Allison's vast TORQMATIC experience to develop a completely modern converter-transmission team for both 2- and 4-wheel-drive models—and here it is!

It's a TORQMATIC CONVERTER, Transmission and transfer gear drop box combined in one rugged, compact, completely self-contained unit that transmits power from 70- to 130-hp gasoline *or* Diesel engines.

Today six loader manufacturers are specifying this TORQMATIC DRIVE in their newest, most advanced loaders—and with good reason.

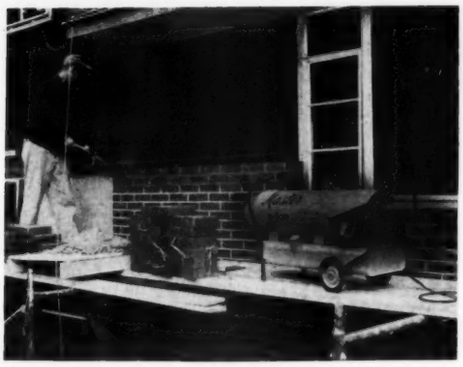
Easier to operate—because, with this new TORQMATIC DRIVE, drivers have no clutch pedal to push—about half the work in operating a shovel-loader is eliminated.

Faster working—drivers quick-shift on the go with slowing down. And the TORQMATIC DRIVE also broad the engine's useful horsepower range for faster, m efficient digging and hauling.

Repair bill savings—eliminates shock-load damag engine and drive-train components. Fewer engine o hauls because engine lugging and stalling is ended.

If you'd build or buy a better loader, be modern— sure it's TORQMATIC-equipped.

This new TORQMATIC DRIVE is now available in m models of shovel-loaders—both gasoline- and Die powered—and will soon be offered in a wide rang other equipment made by leading manufacturers.



THE NEW MASTER B-100 portable heater is a lightweight, economical unit recommended for use in keeping men and materials warm indoors or outdoors, on scaffolds or in areas too small to accommodate conventional-sized units. Despite its small size (weight is 78 pounds without fuel), the B-100 has a 100,000-Btu-per-hour capacity, with a pump motor and fan that blows 500 cubic feet of warm air per minute. The unit burns kerosene or No. 1 or No. 2 fuel oil, and has a fuel capacity enabling it to operate continuously for 12 hours. For further information write to the Master Vibrator Co., 362 Stanley Ave., Dayton 1, Ohio, or use the Request Card at page 18. Circle No. 29.

Extra care keeps equipment operating throughout winter

Whether or not your equipment works this winter, it needs care to see it through the cold months. If it is going to be idle, proper maintenance will keep it in good operating condition for next season. If it works—and there is no reason why it cannot operate satisfactorily regardless of the weather—some precautions can be taken to keep it free of trouble.

Idle machines can be kept rust-free throughout the winter by pouring a cup of crankcase oil into each cylinder once a month. Once a week, oil film on the cylinder walls can be restored by cranking the engine a few turns with the compression off. Similar treatment can be given the starting engine.

Fueling and starting

A few precautions can keep water from getting into diesel fuel and causing trouble. This can be troublesome in any kind of weather, but in winter it causes lines and filters to freeze. Proper storage of diesel fuel will keep it free of water. Refueling should not, obviously, be done in rain or snow. A good idea is to fill fuel tanks at the end of a day and drain off a quart or so before work begins in the morning.

If kept in condition, gasoline starting engines will be dependable, regardless of temperature. Valve and cylinder equipment must be in good condition, or else hard starting and insufficient cranking power will result. Avoid overchoking and fast idling speeds to give the equipment a longer life. If the engine has a two-speed transmission, make full use of the lower speed gears when cranking a cold engine.

Missing drain plugs and gaskets in steering-clutch enclosures should be replaced, and flywheel-clutch compartments drained. When equipment is operating, these compartments can accumulate debris and mud which may freeze and cause serious damage to working parts. Transmissions and final drives should be flushed and refilled with fresh oil of a lighter grade, generally SAE No. 80. Keep a constant lookout for leaking radiators, hoses, water pumps, or gaskets. They are an invitation to trouble when the temperature starts to drop.

Preventing track damage

Tracks, track rollers, and carrier rollers on tractors require some additional attention during cold weather. One big source of trouble—snow packing between the rails of the tracks—can be eliminated by using special snow-track grousers.

Freezing temperatures can cause the most damage to tracks. If a tractor is frozen in mud, the tracks are subjected to huge stresses. Never park a machine where the tracks may be frozen to the ground; a simple log berth for the machine will prevent the tracks from freezing to the ground and eliminate unnecessary work.

A lot of repair costs can be saved if track assemblies are cleaned before a machine is parked. If this is done, mud will not freeze around the rollers and carrier rollers, locking them tight. This is particularly important, for if track rails rub over rollers, wearing flat spots on them, the roller will become practically useless.

THE END

For more information on this great new TORQMATIC DRIVE, fill out the coupon and mail it today.

Allison Division of General Motors
Box 894C, Indianapolis 6, Indiana

Please send me complete information on the new Allison TORQMATIC Converter-Transmission unit.

Name_____

Firm_____

Position_____

Address_____

*I am interested in this TORQMATIC Converter-Transmission unit for*_____ (type of equipment)

Allison TORQMATIC DRIVES

GM GENERAL MOTORS MORE POWER FOR YOU

For more facts, use Reader-Reply Card opposite page 18 and circle No. 272

Built to department specifications, this one-way plow on an International truck is now made commercially by a number of manufacturers. It works at speeds of 20 to 25 mph, while the high rounded section keeps snow from the windshield.

Winter Work

State begins marshaling huge snow-fighting force

With the year poised on the edge of winter, an army of men and more than a thousand motorized units stand ready to go to work on Minnesota roads, keeping 11,820 miles of trunk highway open to traffic. Only occasionally during this winter campaign, such as when blowing snow reduces visibility to zero, will highways be closed to traffic.

To keep highways open, pavements bare, and snow spread so that drifting will be minimized, the state has some giant 8 to 10-ton specially-built truck plows and a few powerful modern rotary plows. The majority of the fleet, however, consists of standard trucks and motor graders which work at other highway-maintenance operations during the rest of the year. Standard dump trucks are converted into snow fighters by a snowplow at the front and a load of sand for ballast. Trucks which in summer carry bituminous distributors, water tanks, or other attachments, appear with new bodies and go to work as sand spreaders during this season.

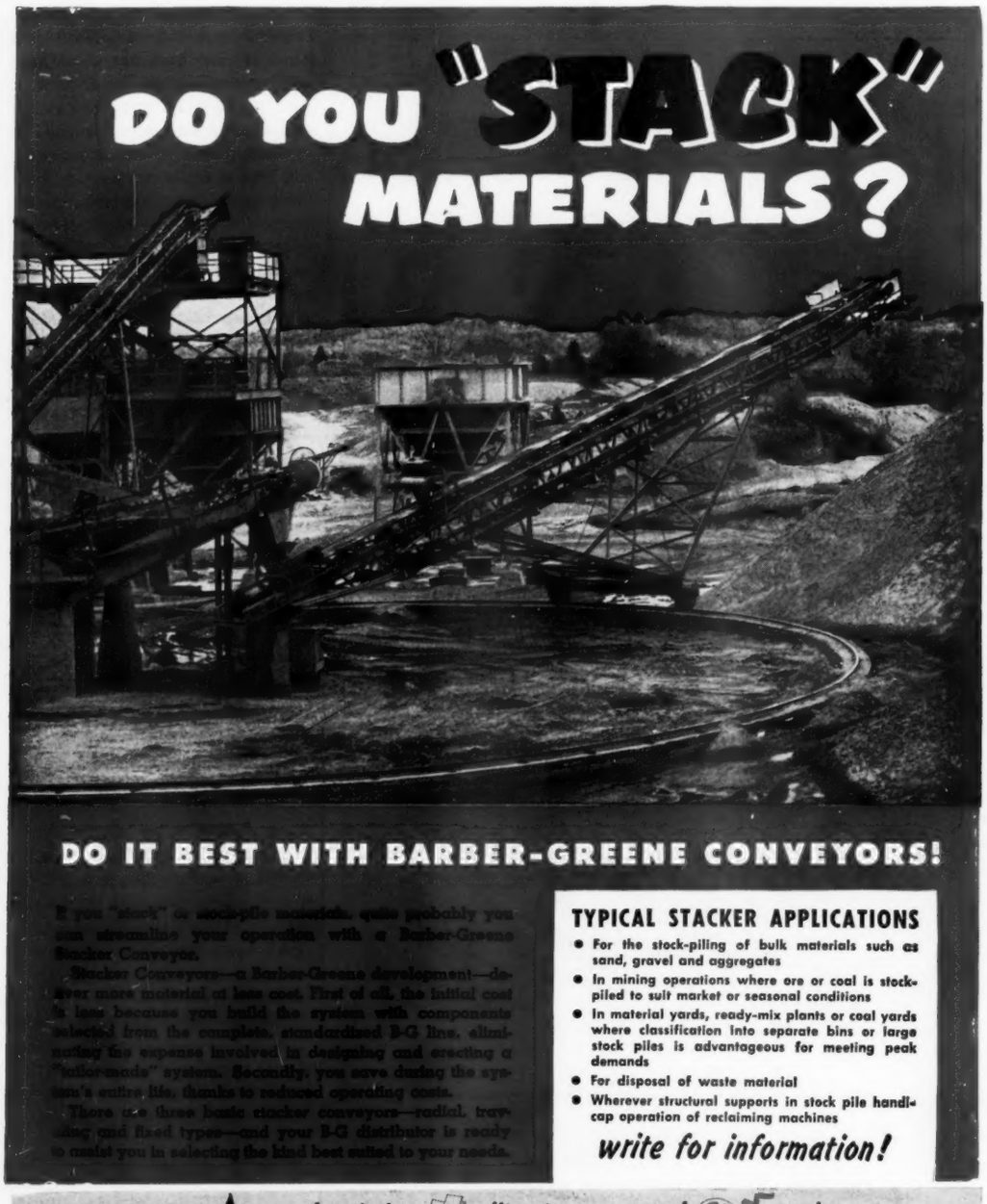
Important elements in the fleet are the 400 contractor-owned motor graders which are made available to the highway department during the winter on an hourly rental basis. Bids are taken each year for furnishing the graders, with the bidders supplying the machine, operator, fuel, and maintenance, while the state furnishes cutting edges, plow bolts and cross link chains.

Normally, all bids are accepted and machines are called when needed on the basis of their cost and availability. The graders, usually available on short notice and well dispersed around the state at contractors' winter quarters, form a strategic reserve of equipment in case of prolonged storms. Since operators are furnished by contractors, they can be called into service at any tme without taxing the department's supply of trained manpower.

Truck snowplow designed

While the Minnesota Department of Highways uses much standard equipment, it has also developed some special machines, including one-way and V-type snowplows which are carried by more than 400 trucks in the 2 to 3-ton class.

The one-way snowplow was selected as the one best adapted to state conditions after exhaustive study and testing. The moldboard is shaped to throw snow far off the highway at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CONVEYORS LOADERS DITCHERS ASPHALT PAVING EQUIPMENT
For more facts, use Reader-Reply Card opposite page 18 and circle No. 273

Packed snow is cleared from the pavement after a heavy storm by a Galion motor grader. Although the road is passable, crews continue to work until the last trace of snow has been removed from the road.

An Allis-Chalmers motor grader with blade and wing is plowing an access road near a main highway. A total of about 400 contractor-owned graders are made available to the department each year on a bid and rental basis.

plowing speeds of 20 to 25 mph, and its high rounded section keeps a minimum of snow from being thrown back onto the windshield of the truck. The pitch and angle of the cutting edge have been designed to get the blade right down to the pavement for the cleanest possible plowing.

Mountings have been standardized so that plows are interchangeable between trucks. Some of the trucks have both V and one-way plows which attach to the same frame. The undercarriage is attached to the truck in the fall and stays there all winter, so that the plow can be attached in a few minutes by inserting four pins.

When this design was perfected, and detailed drawings and specifications prepared by the department, manufacturers were invited to bid. Several responded, and the bidding became highly competitive. Among the trade names commonly seen on these plows around the state are Wausau, Bros, Burch, and Gledhill, and some of these manufacturers now include this plow in their catalog as a standard item.

Another special machine developed in one of the highway department's district shops is a disk-like ice crusher which is mounted under a motor grader or heavy truck. One currently used adaptation of this design consists of a helical auger-like cutter which is attached to the rear of a motor grader. A hydraulic cylinder forces the cutter against ice on the roadway as the grader moves along. In cold weather this shatters the ice so it can be removed with a blade or by traffic.

A simple but ingenious method for keeping a sharp blade edge exposed for ice removal was developed in another shop. It is simply a hydraulic attachment which tilts the blade. This attachment has been adopted by several manufacturers and is now available as optional equipment on motor graders and under-body blades for trucks.

Aside from these few special devices, most of the equipment consists of standard manufacturers' items. In the 5 to 10-ton truck class are the FWD, Oshkosh, and Walter machines, which are usually equipped with V-plow and wing, and sometimes with an under-body blade. Strategically spotted around the state are 76 of these heavyweights. In addition there are 20 FWD 4-ton trucks with plows. Sixteen powerful Snogo rotary plows

(Continued on next page)

Quickest Way to Get a Refusal

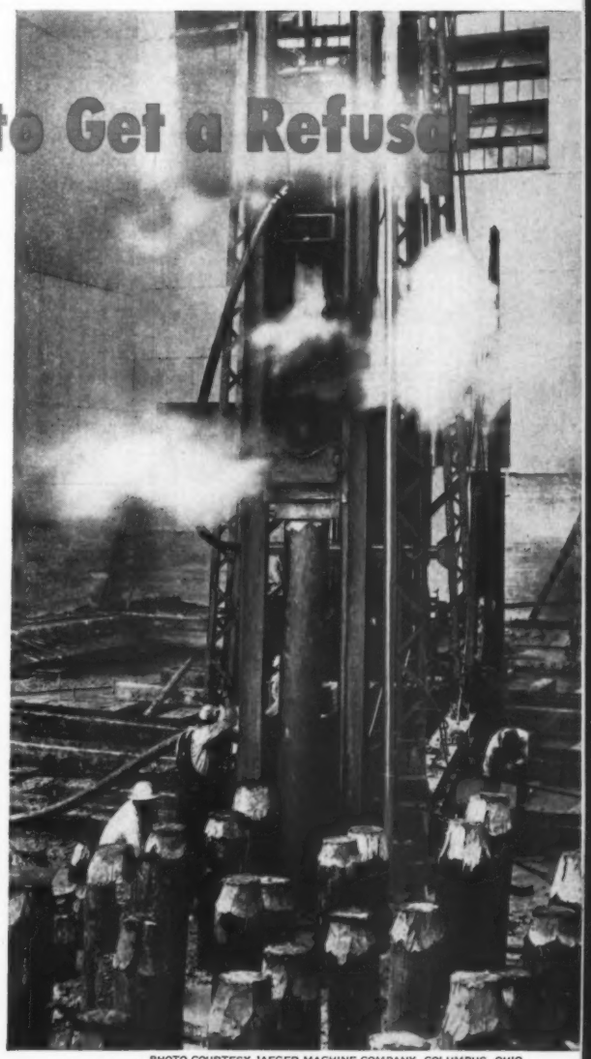


PHOTO COURTESY JAEGER MACHINE COMPANY, COLUMBUS, OHIO

Chrysler-powered jetting pumps help sink 1250 ninety-foot piles into hard-packed sand, averaging 25 per day

Job: foundation for addition to large electric power plant. Objective: bring 1250 ninety-foot timber piles to bear on hard pan underlying tight-packed sand formation. Problem: impossible to drive piles into hard sand with hammer. Solution and method of operation: two Chrysler Ind. 32-powered high-pressure Jaeger jetting pumps operating in parallel or in series as necessity required.

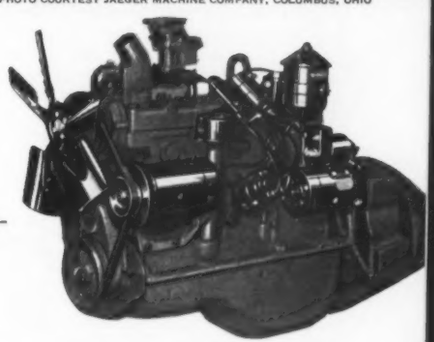
It wasn't that simple, however. Hard-packed sand is never easy to penetrate. Operating in parallel the two pumps discharged 950 gallons per minute at 200 pounds per square inch pressure to blast holes more than eighty feet deep into which the piles sank with only the weight of the hammer. Six to nine minutes of driving with hammer then brought the piles to refusal at hard pan. When greater pressure was needed, the pumps were set to operate in series delivering 475 gallons per minute at 400 pounds per square inch. At many points sand formation was so tight the jet stream would work like a hydraulic piston and send pipe and all shooting out of the ground. To counteract this, extra-heavy pipe weighing over 2800 pounds was used.

Despite difficulties the jetting operation was handled with unusual speed. On the average it took about fifteen minutes to drive a pile to refusal. As many as 33 piles were put down in a single eight-hour day. The two Jaeger Model 5 CPH Pumps and Chrysler Ind. 32—265 cubic inch displacement engines required nothing beyond regular maintenance care.

Assure your users record-breaking performance with top operating economy. Power with *proven-dependable* Chrysler Industrial Engines—230 to 413 cubic inch displacement. A long list of optional equipment enables Chrysler to supply engines to meet end product requirements.

Chrysler Industrial Engines are not expensive. Production-line methods adapted to specialized industrial engine building provide custom-built engines at mass-production prices. See a Chrysler Industrial Engine Dealer, or write:

Dept. 1111, Industrial Engine Division, Chrysler Corporation, Trenton, Michigan.

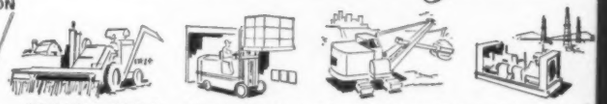


CHRYSLER IND. 32 ENGINE—
265 CUBIC INCH
DISPLACEMENT

CHRYSLER *Industrial Engines*

INDUSTRIAL ENGINE DIVISION • CHRYSLER CORPORATION

HORSEPOWER WITH A PEDIGREE



AGRICULTURE • INDUSTRY • CONSTRUCTION • OIL FIELD

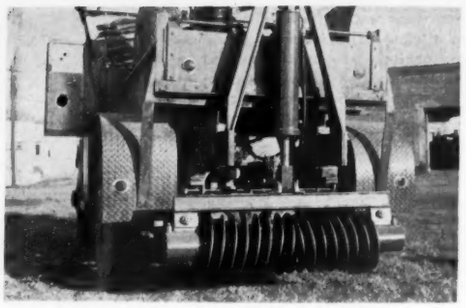
For more facts, use Reader-Reply Card opposite page 18 and circle No. 274

(Continued from preceding page)

are stationed at district headquarters ready for use when needed.

Practically every well known truck is represented among the 426 dump trucks in the 2 to 3-ton size which make up the real backbone of the fleet. Most of the well-known motor graders are also represented among the 130 state-owned and the more than 400 rental machines. Most of the state graders are equipped with wings, but a few still carry the once-familiar V-plows.

Since the department has not standardized on a sanding machine, there is an assortment of these in use. Many of the spreaders are driven from the power takeoff of the trucks. Machines currently in use include Weston and Hi-way hopper-bottom boxes with conveyors and spinners, as well as W-K and other end-gate spreaders.



This crusher, which removes ice from roads without damaging pavements, is another special device used by the department. A hydraulic cylinder forces the crusher against the ice, and the movement of a truck or motor grader causes ice to shatter.

Mobilized by districts

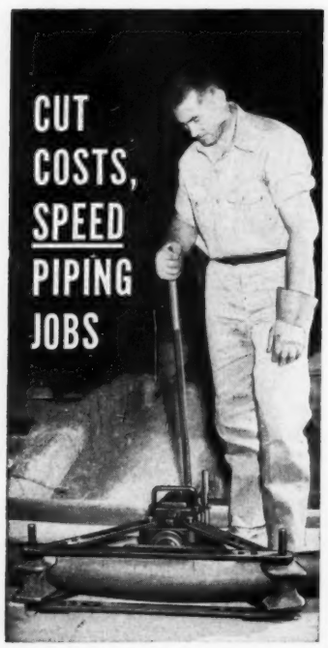
Long before the first snowflakes fall, the state's snow fighters are mobilized and preliminary work begins. The state is divided into 16 maintenance districts with a district maintenance engineer and a general foreman in charge of each. Districts are broken down into areas and sections, with an area foreman and a section maintenance man, respectively, in charge. The average district includes about 25 sections, each of which covers an average of 30 miles of trunk highway.

Although the snow-removal program is carefully directed from the central office in St. Paul, each section operates very much on its own. Each man has his truck and plow and other equipment garaged near his own section ready for use. Larger units are strategically spotted throughout the district, and some of the special equipment and reserve machines are located at district headquarters. All equipment assigned to districts and sections may be temporarily reassigned to other sections or districts in emergencies. A few years ago, when the Dakotas were hard hit by snowstorms, some Minnesota equipment was even dispatched to assist in opening blocked roads in that state.

Before the ground freezes, the crews get out into the fields at critical points and set posts for slat-type snow fences. Erection of the fence is usually delayed until the ground freezes around the posts, making them firm enough to support the fence in winter winds. In some of the northern areas, live snow fences of evergreen trees have been planted as part of a roadside-development program.

During the fall, plow undercarriages, wings, and other equipment are attached to the trucks and motor graders, and each completely assembled unit is given a test run on the highway. Truck plows are then dismounted from the frames and stored in convenient spots ready for use.

Preparation of stockpiles of treated abrasives is completed before winter actually strikes. Sand mixed with calcium chloride or salt is stockpiled at convenient points in each district, and supplies of the pure chemicals are replenished in warehouses. Con-



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The First Reference Book To Cover Every Aspect of Excavation and Earthmoving

Written by a contractor of twenty years experience who is a recognized authority in this field, MOVING THE EARTH contains detailed descriptions of exactly what operations the excavating contractor must perform on literally hundreds of different jobs. You'll also find in it a wealth of information on the operation, maintenance, and repair of just about every machine used in excavating work.

MOVING THE EARTH contains 1,280 pages and 2,500 drawings and photos that can show you the way to lower costs through more efficient operating methods that will also produce better work. The enormous scope of this book—truly "A Workbook of Excavation"—is indicated by the 15-page table of contents listing 4,000 topics.

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tainers filled with chloride-treated sand are set up on roadsides on a few steep hills for emergency use.

Instruction and preparation of personnel also takes place in the fall. In each division, section men make arrangements to be called by local police departments whenever a snowfall begins. Without waiting for instructions from district or central offices, these responsible section men get right to work as soon as a snow starts.

Early plowing important

Almost as soon as the first snowflakes hit the pavement, each section crew picks up its plow, puts on a load of sand for ballast, and plows continually to remove snow before traffic packs it onto the roadway. A thin layer of light snow is easily thrown far off the pavement where it is spread in a ditch or field so that a ridge is not left to start a drift. This early and continuous plowing is most effective in keeping roads open and maintaining bare pavements.

As a storm progresses, the section men keep in touch with area supervisors and district offices by telephone. Additional equipment is dispatched from other sections or from district headquarters if conditions in a section threaten to get out of control. Since bad storms usually cover only a portion of the state at a time, equipment from outlying districts supplements the fleet assigned to a hard-hit area. Temporary transfers are made by the central office on request of the district maintenance engineer.

Except when visibility becomes so low that continued plowing becomes hazardous to equipment and traffic, the fight never stops. Long after it has stopped snowing, the plows continue their patrol, scraping off packed snow and ice, plowing shoulders, and winging to flatten steep banks and push snow as far as possible from the roadway.

If cuts or other bad spots begin drifting full, the powerful trucks with their huge V-plows are dispatched to break open the drifts. Where snow must be blown off the roadway, the district headquarters dispatches a Snogo. If ice or packed snow cannot be removed by plows or motor graders, chloride-treated abrasives or ice-crusher attachments are used to break it up.

Ice-removal operations are dependent on temperatures. Below 10 degrees F, ice is very hard and easily removed by being shattered or broken by a machine. Between 10 degrees and 20 degrees F, ice begins to soften rapidly, and at temperatures above 20 degrees F, it is most readily removed by scraping with motor graders. Chlorides, much more effective at the higher temperatures, are used to assist in the scraping operation.

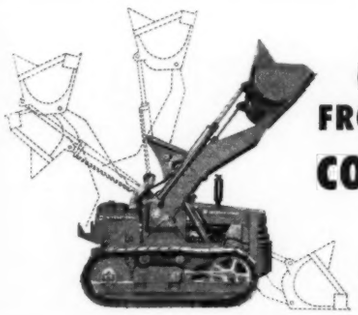
Equipment maintenance

Snow and ice removal is done in cold weather when engines operate under greatest handicaps, and condensation takes place in engine parts, making electrical systems and oil and fuel facilities subject to frequent failure.

To make sure equipment is in top operating condition, each of the 16 districts has a well-equipped maintenance shop, staffed by trained mechanics and a shop foreman, where each machine is carefully checked and repaired before winter arrives. During snow removal operations, major repairs are made in the district garage and minor repairs are made either in the field or the section garage in a minimum amount of time. New or replacement equipment is purchased on bids through the central office and distributed to districts on requisition.

Public information

Notified of approaching storms by the U. S. Weather Bureau, a bureau of road information in the central office keeps districts informed on weather conditions and the public informed on road conditions. Weather forecasts reaching the road information office are relayed by telephone to the districts and thence to the sec-



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This versatile combination overhead and front-end loader costs no more than conventional front-end loaders . . . yet loads *more* dirt, *faster* with your International T-9 or TD-9 than any other loader on the market today!

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50% MORE YARDAGE—no-turn overhead operation eliminates two turns every cycle, doubles yardage every hour

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Emergency!

24 hours of torrential rains made a bog of this excavation site for a New York Public School. A Marlow Mud Hog and four small Self Priming Centrifugal Pumps, *working 'round-the-clock*, kept the hole *workable*. For pump information, see your Marlow Dealer or write for Bulletin C-04.

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- low cost
- high speed single action trailer
- twin pugmills

The first low cost 4-cu. ft. capacity all-weather bituminous mixer. It's compact and solid, highly portable. Send for bulletin FF-29.

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Your choice: Whichever you choose—700 or 400—it will be your best buy . . . because both are Littleford engineered throughout for highest quality.

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tions where snowfall is expected.

As soon as it starts to snow, each section man reports to his district headquarters at regular intervals, giving a detailed description of the road conditions, and reporting areas of spotty or continuous ice, accumulated snow, and, possibly, blocked roads.

Information assembled at district maintenance headquarters on depth and wetness of snow, wind velocity, visibility, and road sections either cleared for one-way traffic or blocked, is telephoned to the road information office at St. Paul. Reports of a blocked section are accompanied by an estimate of the approximate time required before the section can be opened.

This hydraulic cylinder, developed in a district shop, is mounted under a motor grader or under-body scraper to tilt the blade and expose a new and sharp cutting edge to ice on the roadway.

The road information office records all information on mimeographed maps of each district, and the essentials are relayed to automobile clubs, and to the AP and UP for distribution to newspapers and radio and television stations. If a storm lasts all night, late information is turned over to the news agencies before 6 a.m. Further bulletins are issued while the storm lasts.

Another important phase of public information is the driver education program, which the State Highway Patrol carries to motorists through newspaper articles and radio and television programs. This emphasizes the need for winterizing automobiles, and for more careful driving on slippery roads or in heavy storms.

Road design aids crews

Winter maintenance men are being assisted in their jobs by the state's newer highways, which are designed to facilitate snow removal. Regrading of older roads, too, is being done in such a way as to make winter maintenance easier. A typical modern roadway section has a grade elevated above the surrounding land, so that little snow accumulates on the road. The omission of lip curbs and raised islands has also done much to prevent snow from being trapped on the roadway. Wide ditches with flat shoulder and back slopes are catching only limited amounts of snow during storms, yet they provide plenty of space for snow plowed off roadways and shoulders, as do the wide, clear right-of-ways in wooded and partly wooded areas.

Personnel

Heading the maintenance division of the Minnesota Department of Highways is George A. Meskal, maintenance engineer. He had been assistant maintenance engineer under C. L. Motl, who recently resigned to accept a position abroad. Meskal's organized central office staff consists of two assistant maintenance engineers and approximately forty engineering and clerical personnel. THE END

American Explosives and Blasting Supplies Clear the Way for America's Superhighways!

Here's the Breakdown

Highway	No. of Contractors Supplied	Time	Types of Rock	American Explosives Used
Pennsylvania Turnpike	5	1939-40	hard limestone, shale, limestone, traprock, sand rock	40%, 60% ammonia and gelatin dynamites
Philadelphia Extension Turnpike	5	1949-50	hard limestone, shale, limestone, traprock, sand rock	40%, 60% ammonia and gelatin dynamites
Western Pennsylvania Extension	3	1951	hard limestone, shale, limestone, and sand rock	40%, 60% ammonia and gelatin dynamites
West Virginia Turnpike	4	1953-54	shale and sandstone, hard, medium, soft	40% ammonia and gelatin plus semi-gels
New York Thruway	8	1953-55	hard to soft limestone, gneiss rock, traprock, hard shale	40%, 60%, 75% standard gelatin and semi-gel
Ohio Turnpike	2	1953-55	shale and limestone	40% standard gelatin
Kentucky Turnpike	2	1954-55	limestone	semi-gel
Northeastern Pennsylvania Extension	5	1954-55	sandstone and limestone	semi-gel and 40% gelatin
Palisades Parkway	3	1954-55	granite and traprock	semi-gel and 60% gelatin
Maine Turnpike	4	1954-55	granite	semi-gel and gelatin
Massachusetts Turnpike	3	1954-55	traprock, limestone and metamorphosed shist	semi-gel and 40% gelatin

The spread of superhighways over every type of terrain presents a wide variety of construction problems. Leading contractors on major expressways, and quarry operators who supply stone for the right of way, rely on American Explosives for safe, economical handling, good breakage, and dependable results with every shot.

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For more facts, use Reader-Reply Card opposite page 18 and circle No. 280

New salamander heats floor area

■ Jackson Mfg. Co. announces a new gas-fired salamander especially recommended for building, dam, and tunnel construction, and for road-building operations. Rated at 75,000-Btu-per-hour normal output, the unit operates on liquefied petroleum gas.

The Model 750 Hi-Heat salamander is said to offer instant heat either indoors or outside. A dual-purpose shield deflects heat along the floor and eliminates the hot spot often found under these units. Automatic safety shut-off controls are available.

The unit comes completely knocked down in a single carton. Hose assemblies 12 feet long are standard, and extra-long hose lengths may be obtained on request.

For further information write to the Jackson Mfg. Co., Harrisburg, Pa., or use the Request Card at page 18. Circle No. 121.

Fuller enlarges plant

The addition of 56,000 square feet of manufacturing floor space to the Mosel Avenue plant of the Fuller Mfg. Co., Kalamazoo, Mich., will bring the plant area up to 112,000 square feet. Cantilever frame construction, steel roof deck, a wood blocking floor laid on mastic over concrete, thermostatically controlled heat, fluorescent lighting, and a first-aid room are features of the new structure.

Miller Davis Co., Kalamazoo, is architect-engineer and general contractor of the $1 million project.

Pipe, cable indicator

■ The Wilkinson line locator, recommended for use in determining the path of pipe or cable lines before excavating, is described in a folder from the manufacturer.

Besides preventing costly damage to underground facilities, the instrument is said to save contractors unnecessary digging in frozen ground during the winter months. The folder cites instances where "blind" excavating resulted in heavy damage to utility lines.

To obtain this literature write to Wilkinson Products Co., 3987 Chevy Chase Drive, Pasadena 3, Calif., or use the Request Card at page 18. Circle No. 153.

THE NEW BROS rotary snowplow, designed for mounting in place of a front-end loader, is said to load a 5-yard dump truck in 30 seconds. Known as the Series A Sno-Flyr rotary, the plow is reported to have the capacity and versatility of larger more expensive units. The attachment is available in widths of 4 feet 4 inches, 5 feet 6 inches and 6 feet 6 inches. Power requirement is only 30 horsepower, and the plow mounts on jeeps, wheel and track type tractors, motor graders, and other machines. For further information write to Wm. Bros Boiler & Mfg. Co., 1057 10th Ave. S. E., Minneapolis 14, Minn., or use the Request Card at page 18. Circle No. 48.

MARION 43-M

Good Right Arm for Contractors who need to

GET SET NOW!

For

Tough Jobs Ahead!

This MARION 43-M, on a basement excavation job in the northwest, carries 1¼ cu. yd. dragline bucket on 50-foot boom. Removable counterweight is power raised and lowered.

WHY—

GET SET NOW!

MORE TIME to (1) compare equipment (2) familiarize men with equipment before big jobs begin (3) work out financing details without delays (4) give new equipment its "shakedown" runs.

GREATER AVAILABILITY of (1) machines to choose from (2) erection men to assemble machine and train your men (3) front-end equipment to fit your needs exactly.

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43-M!

The MARION 43-M is today's outstanding 1 cu. yd. all-purpose heavy-duty machine. Many extra-value features. Carries 1¼ cu. yd. shovel dipper in stockpiling. A 27-ton lifting crane. With torque converter, serves as 1¼ cu. yd. hoe, 1½ cu. yd. dragline. Ask your MARION Distributor for Bulletin 415 for 12 pages of pictures and facts about a machine designed and built for big production on the heavy-duty big jobs ahead.

USE THIS CHECK LIST TO GET SET NOW!

	Shovel (Cu. yds.)	Crane (tons)	Hoe (Cu. yds.)
MARION 32-M	¾	17½	¾
MARION 43-M	1	27*	1–1¼
MARION 362	1½	37	1½–2
MARION 372	—	43	—
MARION 83-M	2	60	2–2¼
MARION 87-M	—	75	—
MARION 93-M	2½	80	—
MARION 101-M	3	84	—
MARION 111-M	4	169	—

*Rated at 10' in accordance with general practice

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PILE DRIVERS • WALKING DRAGLINES • CRANES, CRAWLER & RUBBER MOUNTED • BACKHOES

For more facts, use Reader-Reply Card opposite page 18 and circle No. 281

This petroleum wharf of steel H-piles, with a 200-foot-long face and a concrete deck, was part of construction done at the Haines terminal facility. Here the U. S. Navy Tanker Millicom delivers the first shipment of diesel fuel to the terminal.

U. S. Army Photos

Winter Work

Pipeline teams hurry work on 625-mile facility

Just a few weeks ago, the U. S. Army Corps of Engineers brought work to a close on the construction of the $40 million Alaska pipeline running 625 miles from Haines, on the coast, to Fairbanks, in the interior of the territory. Under construction for 2½ years by U. S. and Canadian crews to supply petroleum products to U. S. bases in the interior, the line was put down while cold and unfavorable weather conditions vied with the rugged terrain to hamper the work.

With the exception of some tie-ins, the welding of the pipeline was completed in six months. Terminal facilities and pumping stations were completed recently by the joint-venture contractors, Williams Bros., Tulsa, Okla.; McLaughlin Construction Co., Great Falls, Mont.; and Marwell Construction, Ltd., Vancouver, B. C., Canada.

Altogether, 3,304,089 feet of 8⅝-inch seamless steel pipe was required for the pipeline. Wall thickness of the pipe is 0.277 inch, except for 42,847 feet of 0.312-inch pipe needed for stream crossings and on the discharge side of one of the pumping stations.

Capable of holding about 209,000 barrels of fuel and pumping about 12,000 barrels per 24-hour day at normal capacity, the line generally follows the route of the Alcan highway from Haines to Fairbanks. From the heavily timbered and mountainous country north of Haines, it runs to the coastal range of mountains reaching a maximum elevation of 3,750 feet. From here it goes down into the valleys of northwestern Canada and central Alaska to Fairbanks.

Clearing operations along the right-of-way started in mid-December, 1953, and men and equipment had to work through this coldest part of the year in temperatures as low as 60 degrees below zero, even though work in this northern area is largely confined to the months between May and November.

For this work, two unusual techniques were used. One involved the use of a 6-foot-diameter steel clearing ball which was pulled by two Caterpillar D6 tractors. This method proved effective in small brush, but was of no use in the heavy timber near Haines. The second method had

The LINE forms on the RIGHT!

For these NEW PAYLOADER® tractor shovels

We anticipated some of this demand....

But apparently not enough....

We're increasing our production....

We're expanding our facilities....

However, since these new models outproduce and outperform other tractor-shovels, we expect the demand to increase even more. If you are interested in more production at lower costs, your future needs will probably include one or more of these new "PAYLOADER" models.

Because of the current demand we suggest you contact your "PAYLOADER" distributor *at once* and discuss your needs with him.

These new models have been designed and are being built by The Frank G. Hough Co. who introduced the first four-wheel-drive tractor-shovel and who have produced more unit-design tractor-shovels than all other firms put together.

model HU 1 cu. yd.

model HH 1½ cu. yd.

model HO 2 cu. yd.

The complete proven "PAYLOADER" line of tractor-shovels includes sizes ranging from 18 cu. ft. to 2 cu. yd. bucket capacity and available in four wheel drive, rear wheel drive and front wheel drive types. They are sold and serviced by the largest, most experienced Distributor organization in the business.

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Send information on "PAYLOADER"
☐ model HU ☐ model HH ☐ model HO

Name.....
Title.....
Firm.....
Street.....
City.....
State.....

For more facts, use Reader-Reply Card opposite page 18 and circle No. 282

A Caterpillar tractor with bulldozer does extra duty, hauling a construction vehicle out of mire near the right-of-way in the Yukon territory.

A tractor equipped with a sideboom handles the 8⅝-inch pipe for a stringing crew working near Fairbanks.

a Caterpillar powered dragline attached by pulleys to the top of a "spur tree" while it dragged heavy stumps and logs into a pile at the base of the tree for burning. In heavy timber, the method did not work too well and was abandoned.

Excavate 122 miles of trench

Though the bulk of the line is above ground, using suspension spans and road bridges where various types of crossings are necessary, about 122 miles of the line had to be buried. Ditching for the line was done by American crews on a 24-hour-a-day basis, with two 12-hour shifts working 6 days a week. Sunday, when work closed down, trenching equipment was overhauled and repaired. Equipment failure was never a serious problem, but maintenance costs were high because of the difficult terrain encountered by crews.

Trenching was done in a variety of soils. Solid rock, sandy soils having little or no frost content, and muskeg and tundra with permafrost soils underneath had to be excavated. When rock or permafrost was encountered, blasting was required.

Excavation by American crews was done with two key pieces of equipment, a modified Cleveland 300 ditcher and a Bucyrus-Erie crane with backhoe and clamshell.

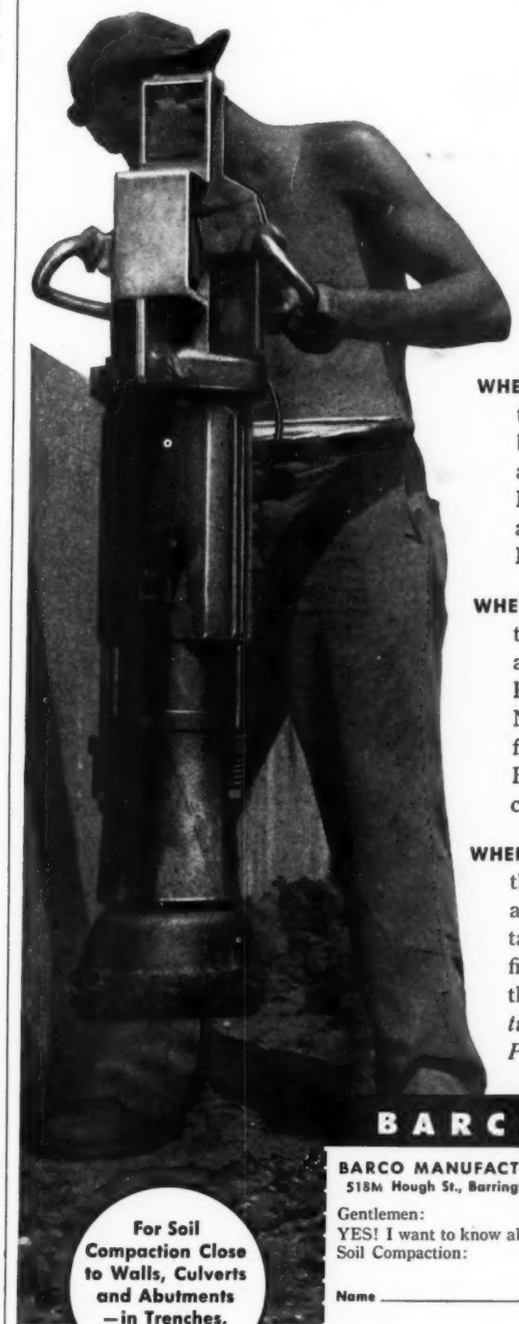
The ditcher's modification consisted of a 12-foot-diameter wheel which was substituted for the standard 18-foot wheel. Fourteen buckets on this special wheel were spaced close together so that the machine had a continuous digging cycle. This eliminated the jarring action which would have been caused by widely separated buckets hitting the earth at longer intervals. Despite the difficult digging, the modification also increased the life of the machine by making trenching smoother.

The backhoe and clamshell on the Bucyrus-Erie ordinarily worked with the ditcher, cleaning out the trench while the Cleveland machine excavated through icy and non-icy soils. It also excavated the pipeline trench through rocky soil, and dug the trench in stream beds and at road crossings.

With this combination of equipment, the American spread laid an

(*Continued on next page*)

WHEN CONSTRUCTION JOBS CALL FOR SOIL COMPACTION



BARCO is the ANSWER!

WHEN YOU'RE FIGURING FOR THE "LOW BID"—No other tool can give you the economy and dependability offered by Barco Rammers on high degree soil compaction for all kinds of projects—Atomic Energy, Hydroelectric Power and Flood Control Dams, Highways, Toll Roads and Freeways, Airports, Bridges, Buildings, and Housing Developments!

WHEN YOU HAVE TO MEET TOUGH SPECIFICATIONS—In test after test, Barco Rammers have demonstrated their ability to deliver 95% to 97.5% compaction (modified Proctor Method)—EASILY! EFFICIENTLY! ECONOMICALLY! The Barco Rammer is especially useful for compacting fill in restricted areas. ONLY the Barco Rammer can produce specified high degree compaction on lifts up to 20 inches.

WHEN YOU'RE UP AGAINST A TIGHT SCHEDULE—One of the biggest advantages offered by Barco Rammers is ability to handle work in minimum time. On area tamping, one man can average 20 to 30 cubic yards of fill per hour. On trench backfill, using lifts up to 24", the rate for 18" trench is 360 to 600 feet per hour. *When time is at a premium, BARCO PERFORMANCE PAYS DIVIDENDS*—find out about it NOW!

BARCO *GASOLINE* RAMMER

For Soil Compaction Close to Walls, Culverts and Abutments —in Trenches, Ditches

BARCO MANUFACTURING CO.
518M Hough St., Barrington, Illinois

Gentlemen:
YES! I want to know about Barco Rammers for Soil Compaction:

Name _____

Company _____

Address _____

☐ Please send me the name and address of your nearest dealer.

☐ Without obligating me, I would be interested in a DEMONSTRATION.

☐ Please send General Catalog No. 621.

☐ Please send free bulletin on "SOIL COMPACTION COST DATA"

For more facts, use Reader-Reply Card opposite page 18 and circle No. 283

A portable pumping apparatus, consisting of a Gardner-Denver pump driven by a Ford motor and mounted on the bed of a Ford F-600, makes pressure tests on a section of pipeline.

(Continued from preceding page)

average of 70,330 feet of pipe, or 1,675 joints of pipe, every week. The Canadian spread, though its weekly average of 75,768 feet of line, or 1,804 joints of pipe, was higher, operated on a 7 rather than a 6-day week. The best Canadian production was 420 joints of pipe, or 3.3 miles of completed line in one week. The highest rate achieved by the American crew was 27,764 feet of pipe in a week. This amounts to 542 welded joints, or 4.31 miles of finished line.

These amounts represent a considerable achievement, considering the tough working conditions in this section of the territory. Permafrost, encountered mostly in the valleys and occasionally on hills, often began just under the grass cover and continued down to undetermined depths. When the cover was disturbed, the permanently frozen ground often thawed, turning the right-of-way into a quagmire. Often, in wallowing through the muck, equipment sank down to underlying ice. Melting permafrost sometimes created such swampy areas that detours had to be made for equipment, and concrete weights had to be tied to the pipeline to keep it from floating to the surface.

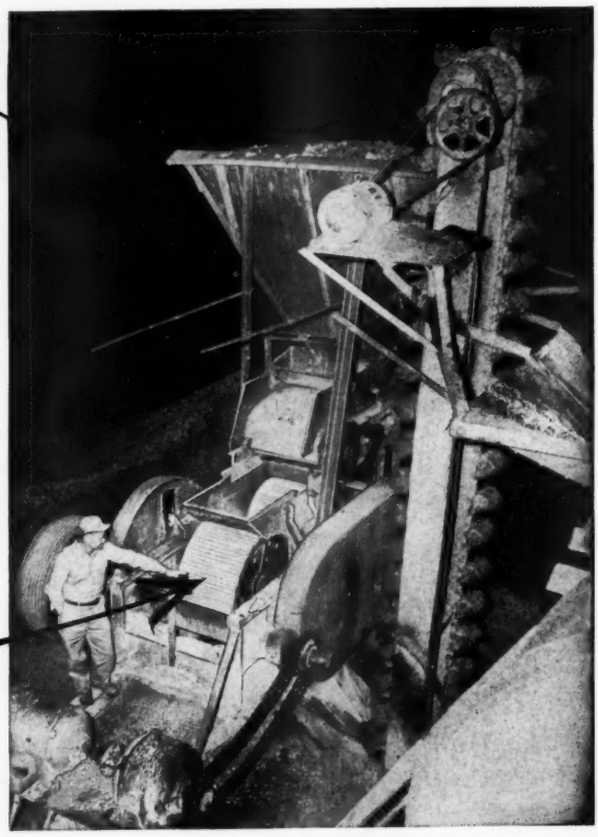
In rock wash areas, the line had to be buried deep to give it adequate protection. Muskeg hindered men and equipment often, sometimes bogging machines down so that they had to be hauled out of the soft area by a dragline. In at least one instance, the cold worked to the benefit of crews, for quicksand found in small areas was usually frozen over.

One of the toughest portions of the job was in the Kluane Lake region. Estimates on either a 7-mile crossing of the lake or a skirting of the lake were taken, but running the pipeline around the lake proved to be more economical, even though it added eight miles to the length of the line. In this area, flash floods caused by rain and runoff from glaciers washed out portions of the right-of-way, highway, and bridges at one time, delaying operations considerably.

Pumping and terminal facilities

The pipeline has terminal facilities at Haines consisting of a petroleum wharf, storage tanks, and universal manifold and pump facilities to permit fuel to be transferred to any of the tanks. The wharf is a T-type structure of steel H-piles with a con-

Crushing Life Increased 500% by **Hard-Facing** with HAYNES 90 rod



Hard-facing the rolls in this crusher rig with HAYNES 90 Rod makes them more than 5 times more durable. Two sets of rolls are used to crush rock from 3-in. down to ½-in. screen size. They handle up to 26 thousand tons of rock with a minimum of repairs—despite severe wear from abrasion and impact. Other hard-facing materials wore out before 5,000 tons of rock were crushed.

Since HAYNES 90 Rod was adopted as the standard material on this job, production increased, down-time was reduced, labor and maintenance costs were cut, and less hard-facing material was needed per ton of rock crushed. This is typical of the kind of savings that can be realized by hard-facing with HAYNES alloys.

HAYNES hard-facing alloys give outstanding service when used to protect parts in crushers, shovels, tractors, trucks, conveyors, and other metal parts exposed to wear from abrasion, impact, corrosion, or heat.

Your local dealer carries a complete line of HAYNES hard-facing alloys, including: HAYNES iron and nickel-base rods, HAYNES STELLITE cobalt-base rods, and HAYSTELLITE tungsten carbide tube rods. Ask him for descriptive literature. If you don't know the location of your local dealer, write to Haynes Stellite Company, a Division of Union Carbide and Carbon Corporation, Kokomo, Indiana.

See... Your local Haynes Stellite Dealer

or

Write... to Haynes Stellite Company

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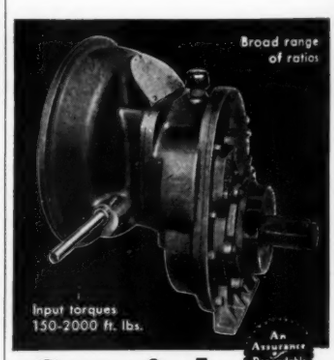
For more facts, use Reader-Reply Card opposite page 18 and circle No. 284



Special heavy-duty

- **Transmissions**
- **Reduction Units**
- **Mechanical Drives for Torque Converters**

Cotta Transmission Co., Rockford, Illinois

COTTA HEAVY-DUTY TRANSMISSIONS

"Engineered-to-order"

For more facts, circle No. 285

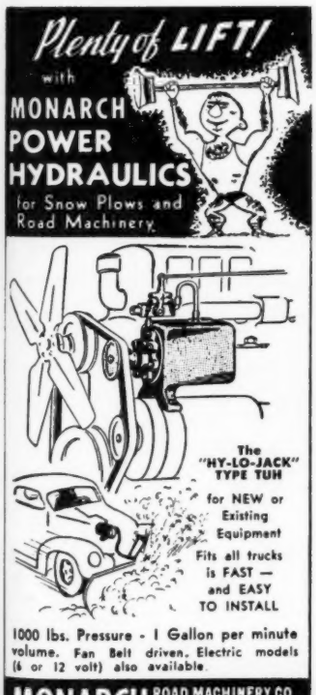
crete deck and a 200-foot-long face. Twelve steel cone-roof storage tanks at this end of the line include nine with a 30,000 barrel capacity, two which hold 5,000 barrels of fuel, and one of 1,000 barrel capacity. Similar facilities are located at the Tok Junction terminal, which has one additional 5,000-barrel-capacity tank.

Of the project's five pumping stations, three will be used in normal operation. Station No. 1, on Lutak Inlet, consists of the mainline pump structure and 11 other buildings for pump engines, manifold and transfer pump utilities, offices, shop and warehouse, POL laboratory, and housing for personnel. The power pumps, rated at a maximum of 272 gpm, are driven by Chicago Pneumatic diesel engines working through Western Gear Works speed reducers. Similar equipment is located at Station No. 2, 48 miles northwest of Haines; Station No. 2-A, 10 miles northwest of Haines Junction; Station No. 2-B, nine miles southeast of the Donjek River on the Alaska highway; and Station No. 3, near Tok Junction.

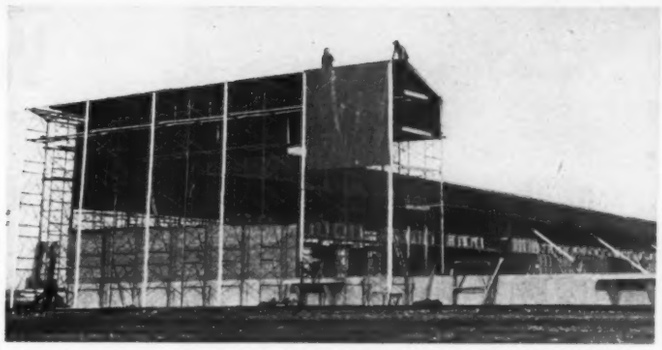
Facilities for crews

At the peak of work, about 775 men were employed on all phases of construction, 280 of them on two pipeline spreads and the remainder on the five pumping stations. Dormitory-type bunkhouses were located at all pumping stations, along with modern mess halls.

Men in the two main pipeline spreads, working in Canada and Alaska, were housed in modern trailers which moved ahead with the pipeline, setting up at 75-mile intervals along the route. Trailer offices, kitchens, mess halls, and bath houses were provided for the crews. In some cases, crews operating away from established camps were housed in commercial lodge facilities on the Alaska highway. THE END



For more facts, circle No. 286


SERVING A DUAL purpose on this warehouse project at Whiting, Ind., Safway tubular steel frame-type scaffolding is used both to support mason's working and supply platforms and as a framework for tarpaulins during cold-weather work. Ragnar-Benson, Inc., Chicago, erected the first scaffolding in December and removed the last units the following May. During the winter months, crews and materials within the tarpaulin enclosure were kept warm by bottle gas heaters. For further information about Safway scaffolding write to Safway Steel Products, Inc., 6234 W. State St., Milwaukee 13, Wis., or use the Request Card at page 18. Circle No. 81.

Lowers the boom on maintenance costs with TIMKEN® bearings to take shock loads

TO help keep its newest, largest dragline—Model 1855—doing a rugged job with minimum time-out for maintenance and repairs, the Harnischfeger Corp relies on 15 Timken® tapered roller bearings at vital points. Some of these applications are the intermediate swing shaft, digging and hoist drum shaft, bevel pinion shaft and fairlead.

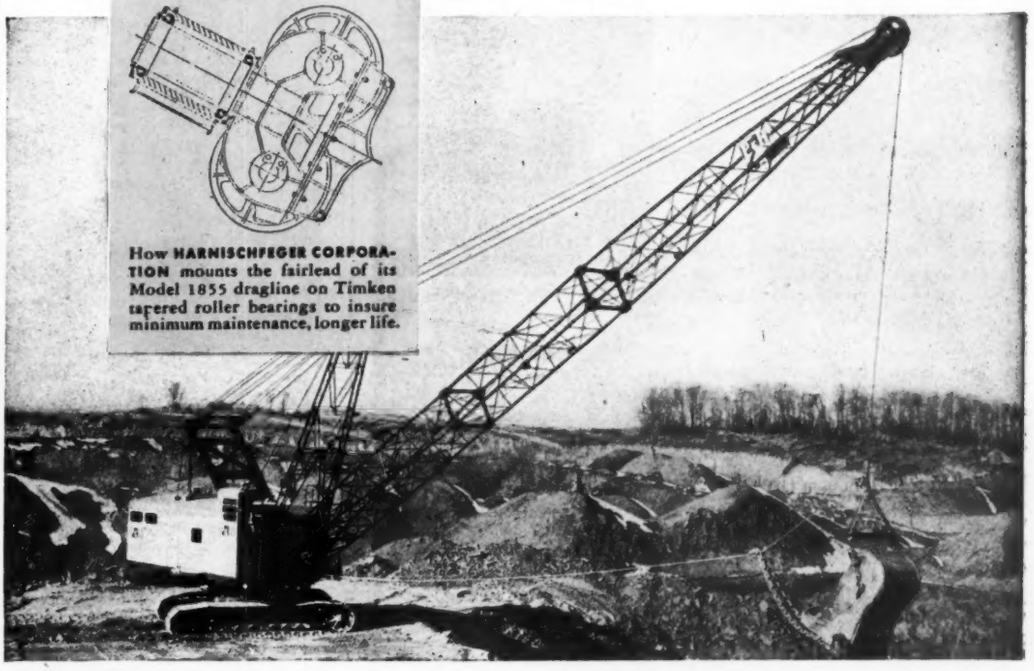
Imagine the shock loads put on the intermediate swing shaft when the cab, the boom and an 8 yard load of dirt being swung through the air are suddenly stopped and the direction reversed! Timken bearings take such shock loads with ease. That's because their rollers and races are case-carburized to give them tough, shock-resistant cores under hard wear-resistant surfaces.

The Timken bearings on the digging and hoist drum shaft take the full weight of lifting and lowering the loaded bucket. Full line contact between rollers and races of Timken bearings gives them the extra load carrying capacity they need. And due to their tapered design, they carry both radial and thrust loads in any combination. Timken bearings take the thrust loads from the pinion gears and fairlead, insure accurate alignment. Gears mesh smoothly, last longer.

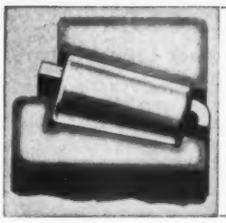
To get steel good enough for Timken bearings, we had to make our own. We're the only U. S. bearing maker that does. So always specify Timken bearings. They give longer life with less friction. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

How HARNISCHFEGER CORPORATION mounts the fairlead of its Model 1855 dragline on Timken tapered roller bearings to insure minimum maintenance, longer life.



TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS



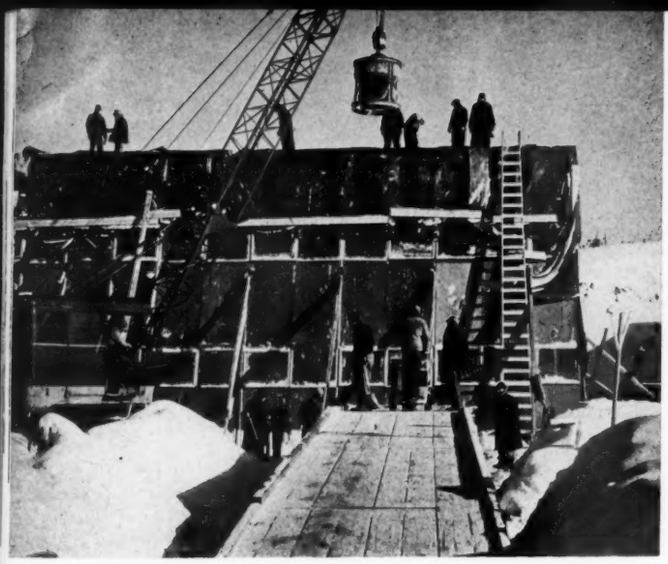
HARD ON THE OUTSIDE, TOUGH ON THE INSIDE

Rollers and races of Timken bearings are case-carburized to give a hard, wear-resisting surface and a tough, shock-resisting core. Result: longer bearing life.

The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis Timken steels.

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ▯ AND THRUST ↔ LOADS OR ANY COMBINATION

For more facts, use Reader-Reply Card opposite page 18 and circle No. 287



Although concrete is poured through openings in the roof, the area within the enclosure is still warm. Kwik-Mix Moto-Bugs traveled a portable ramp to a point where they could discharge into 1-yard concrete buckets.

C&E Staff Photos

Winter Work

Walls for two huge reservoirs

Movable enclosures, complete with windows, lights, and heaters, permitted construction of two huge reinforced-concrete reservoirs to continue throughout the winter. Built by the Minneapolis, Minn., water department, the big wood-frame housings were covered with Masonite Presdwood which not only kept the concrete warm for proper curing, but also provided warm, dry, and comfortable work areas for the men building forms, placing reinforcing steel, and pouring concrete.

Two types of enclosure were used—one for thawing the ground and pouring the footings and the other for constructing the walls. The wall enclosures—60 feet long, 24 feet high, and battered from 20 feet wide at the bottom to 12 feet at the top—were framed with 2 × 6 studs and roof joists with knee braces at the upper corners to provide rigidity. Outside walls were covered with ⅛-inch Presdwood. To facilitate pouring and moving, the top and ends were closed with tarpaulins. Enclosures were mounted on

STUCK, LOOSE, BROKEN, STRIPPED THREADS?

MAKE SIMPLE, SAME-SIZE REPLACEMENTS

on the spot with *HELI-COIL** Shop-pack

Here's how contractors and engineers are using ***Heli-Coil*** Shop-packs to reduce downtime, save overhead and meet contract date specifications.

Downtime is costly, particularly when the contract carries a penalty clause. Here's a new, tested technique for beating the clock. You can now replace stripped, damaged or corroded tapped threads *in the field* with ***Heli-Coil*** Shop-packs. Any workman can repair your equipment on the job in minutes. No time is lost in sending disassembled parts to central repair depots. Downtime amounting to hours and sometimes days is eliminated.

There is a ***Heli-Coil*** Shop-pack for every size thread and all types of equipment. Each contains a tap, inserting tool, generous supply of inserts and full instructions. Use Shop-pack for permanent, back-to-original size, stronger-than-ever repairs...made in minutes.

Call your supplier *today* or mail the coupon for Shop-pack details.

*Reg. U. S. Pat. Off.

HELI-COIL CORPORATION

691 Shelter Rock Lane, Danbury, Conn.

Please send me Bulletin No. 724A on the NEW Shop-pack.

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Company_____

Address_____

City_____ Zone____ State_____ 1941

For more facts, use Reader-Reply Card opposite page 18 and circle No. 288

NEW METHOD . . .

DELIVERS HIGHER COMPACTION IN FEWER PASSES

On recent construction jobs *optimum compaction* has been produced to a *depth of 2 feet* after *2 passes* at 2 mph with the new Vibro-Plus Vibratory Roller. Strata substantially deeper than 2 feet have also been compacted with excellent results after 2 to 6 passes.

The Vibro-Plus Vibratory Roller is a self-contained unit of three tons, delivering a seven-ton centrifugal impact which compacts statically and dynamically in all directions. The unit is easily towed by rubber-tired tractors, is vibration and trouble-free, extremely economical and low in initial cost. Reports of special field tests and folder will be sent upon request.

VIBRO-PLUS PRODUCTS, INC.

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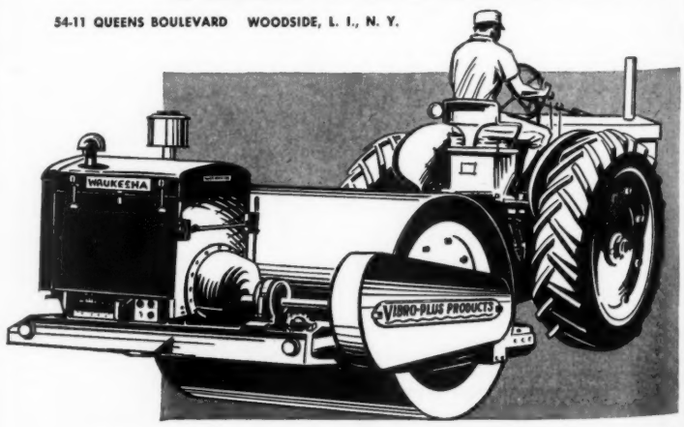

For more facts, use Reader-Reply Card opposite page 18 and circle No. 289

rvoirs poured inside movable enclosures

Heat, light provide comfortable working conditions; permit construction to continue during the winter months

Panels of insulation with Flex-O-Glass windows were used to enclose concrete construction. The windows, made of reinforced translucent cloth-like material, admitted a great deal of natural light.

4-inch steel casters bolted to the sills. Casters rolled on wood-plank tracks when the structure was being moved.

Although framed openings at two elevations in the walls were covered with Flex-O-Glass reinforced translucent cloth-like material, which admitted a large amount of natural light, additional illumination was provided by electric lights when necessary.

Heating units devised on the job consisted of a 12-foot length of 12-inch corrugated-iron pipe suspended in a horizontal position from the sloping walls of the enclosure. A gas jet burning liquefied petroleum gas was inserted in one end of the pipe, which acted as a radiator to dissipate the heat evenly in the area.

Reservoirs have large capacity

The 20 and 22-million-gallon reservoirs were built on the top of a hill near the city's water-treatment plant. Although they are known as Hilltop No. 1 and Hilltop No. 2 res-

(Continued on next page)

LOW COST PORTABLE HEAT
saves time and money for contractors

For only a few cents an hour in fuel, you can dry plaster, fast, even on cold or humid days; pour and cure concrete safely at any temperature and keep men working, inside or out, in freezing weather. That saves hours of time . . . and time means money.

Your Master Heater rolls into place, starts at the flip of a switch. You don't need a vent. Three models put out 100,000; 160,000 or 400,000 BTU's per hour; burn inexpensive kerosene or fuel oil.

The low price is repaid time after time in hours saved and workmen working.

Write for full information or see your Master distributor.

MASTER VIBRATOR COMPANY
353 Stanley Ave., Dayton 1, Ohio

MASTER

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NEW LETOURNEAU TREE SAW

FIELD REPORT: ***Mobile Saws Cut 1.3 Acres of Heavy Timber Per Hour at Felling Cost of Less Than $12 Per Acre!***

On a Texas clearing project for a flood control reservoir, two big LeTourneau Tree Saws are cutting hardwood timber averaging 14 inches in diameter and over 70 trees per acre. Each machine is cutting 1.3 acres per hour, including seasoned hardwood stumps up to 54" in diameter. Underbrush is cleared away by tractor, permitting the saws to maneuver quickly and cut all trees at ground level.

The contractor estimates he owns and operates each saw for $15 per hour and figures his felling cost at less than $12 per acre — a basic cost well worth considering in planning *your next job!*

Pusher boom directs tree to one side as saw blade moves forward.

High-speed revolving blade takes this 24-inch tree in single cut.

Flush-with-ground cuts leave land ready for disc plowing.

Equally Efficient for Logging

The new LeTourneau Tree Saw means that jungle and swamp timber land formerly too costly to clear can now be converted into productive earth. The big Saw also offers new opportunities for logging jobs where solid acres of timber are to be cut — with a fast, systematic means of cutting that requires just *one operator!* Write for information and operating data on a LeTourneau Tree Saw today!

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27511 South MacArthur, Longview, Texas, U.S.A.
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Distributorships available in several countries. Write Today! C104

For more facts, use Reader-Reply Card opposite page 18 and circle No. 291

(Continued from preceding page)

ervoirs, a common wall between them makes the two practically one continuous structure. Each of the rectangular tanks is approximately 264 feet wide, 520 feet long, and 22 feet high. Together they make an almost square structure.

Exterior walls are cantilever retaining walls battered on the outside from 12 inches thick at the top to 26 inches at the bottom. Floors and roofs are of flat-slab construction, and square concrete columns with capitals and drop panels support the slab roof. The completed structures were covered with two feet of earth and were landscaped.

Designed in the offices of the Minneapolis Water Department, the two reservoirs were built by the city on a day-labor basis at an approximate cost of $3,300,000.

Thaw frozen ground

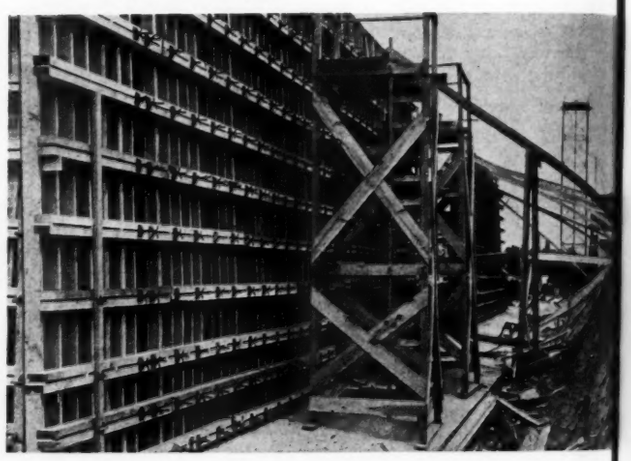
The major winter construction operation consisted of building the exterior retaining walls. The remainder of the structure was constructed during the warmer weather. When necessary, snow was plowed from the previously graded site with Caterpillar D4 tractor-dozers before the low enclosures were moved in. Each of these four housings—one for each corner—was 60 feet long, 20 feet wide, and 8 feet high, and was fitted with windows, lights, and heaters similar to those in the larger enclosures.

Temperatures inside the enclosures were sometimes as high as 100 degrees F and were maintained for two days to thaw out the ground. Fans circulated the heat against the ground to facilitate the thawing.

Once the ground had been thawed, workmen moved in to build the form, place the reinforcing steel, and pour the footings and shear key. The housing was left in place until the concrete was cured and the temperature gradually lowered to that of the outside. One of the D4 tractors then hooked onto the small enclosure and pulled it ahead to the next position.

The large housings were then slid into place by the D4, and work was started on the wall section. After the two mats of reinforcing steel had been tied into place, wall forms were erected. Built of ⅝-inch plywood backed by 2×6 studs at 12-inch centers and braced with double 3×6

Forms for the reservoir walls are faced with ⅝-inch plywood backed by 2 x 6 studs on 12-inch centers and double 3 x 6 wales. Williams removable form ties were used.



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BELT FASTENERS

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- A FLEXCO fastener that is HINGED. Has removable hinge pin.
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Order From Your Supply House. Ask for Bulletin HF 500.

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Rolatape THE MODERN, MOBILE MEASURING INSTRUMENT
FOR LOW-COST, ACCURATE MEASURING

MODEL "400" This Model is a favorite and is widely used by Telephone Companies and other Utilities, paving contractors, land appraisers, etc. It's four-foot circumference measuring wheel makes it most suitable for measuring fairly rough terrain. Automatic measuring counter can be reset at any distance. Folds compactly.

MODEL "200" A popular Model for interior and exterior use. Tabulates wall-to-wall, vertical, or a 101 other measuring assignments. Folds compactly for kit or glove compartment.

MODEL "600" For cross country acreage measurement and work on rougher terrain.

NOTE—All Rolatape Models are designed to tabulate accurate measurements, and are constructed for long and dependable service. With Rolatape, you measure as you walk.

FOR COMPLETE ROLATAPE INFORMATION AND PRICES PLEASE WRITE

ROLATAPE, INC.
1741 14th Street, Santa Monica, Calif.
OR SEE YOUR LOCAL DEALER

For more facts, use Reader-Reply Card opposite page 18 and circle No. 294

wales, these forms were tied with Williams removable form ties.

Buggies transport concrete

Heated concrete for winter pours was produced in a plant set up at the job site. The aggregates and water were steam heated to produce finished concrete at 70 to 80 degrees F regardless of the weather or air temperature. A Koehring 1-yard mixer discharged into a fleet of Kwik-Mix Moto-Bug motorized buggies. At the pour, a portable ramp was set up to bring the Moto-Bugs up high enough to discharge into 1-yard concrete buckets which were hoisted to the forms by truck cranes.

As a pour was being made, the canvas covers over the top of the enclosure were opened to expose the top of a job-built steel hopper riding on the top of the forms. Buckets of concrete were raised by the cranes and dumped into the hopper. Tremies with removable sections conducted the mix from the hopper into place in the form. Homelite electric vibrators consolidated the concrete as it was placed.

Altogether the two reservoirs required a total of more than 25,000 cubic yards of air-entrained concrete and 1,700 tons of reinforcing steel. Entrained air was maintained at approximately 4½ per cent by adding Darex air-entraining agent at the mixer.

Casting of a 50-foot wall section containing approximately 65 cubic yards of concrete was easily completed in from three to four hours. In cold weather, the canvas covers were opened only enough to permit concrete to be placed, and little heat was lost. A temperature of 70 degrees was maintained in the enclosure for three days, and then slowly lowered to 50 degrees for four more days. After this seven-day period of heat curing, the temperature was lowered at a rate of two degrees per hour or less until it corresponded to the outside temperature.

Form wales were normally removed after the first day of curing. The forms were stripped after three days of curing and lowering of the temperature, the enclosure was then slid ahead to the next position, and the process was repeated.

Personnel

Construction superintendent for the Minneapolis Water Department on Hilltop No. 1 reservoir was Richard Teague. He left the department to become city engineer of St. Cloud, Minn., and Charles H. Swain took over as construction superintendent on the Hilltop No. 2 structure. Superintendent of the water department during the construction of both reservoirs was Edgar Johnson, who recently retired. L. L. Halladay is now superintendent. THE END

Line of snowplows

■ A four-page folder, issued by Wm. Bros Boiler & Mfg. Co., describes the Bros Series A Sno-Flyr rotary snowplows. These plows are the front-end-loader-mounted models for wheel-type tractors and jeeps. The folder shows how the Series A rotary attaches to the front-end tractor loader with the same pins and connections used to attach the loader bucket. The plow also mounts on crawler tractors, motor graders and jeep trucks. Several makes of tractors equipped with the Series A are shown.

To obtain this literature write to Wm. Bros Boiler & Mfg. Co., Road Machinery Division, 1057 Tenth Ave. S. E., Minneapolis 14, Minn., or use the Request Card at page 18. Circle No. 152.

Interesting information — generally speaking, hard woods come from broad-leaved trees. Most soft woods come from evergreens.

Clark opens new plant

Before the year is over, Clark Equipment Co., Buchanan, Mich., will open a plant in the San Francisco Bay area of California. The plant will enable the company to make overnight deliveries of spare parts anywhere west of the Rockies.

KOHLER ENGINES

4-CYCLE • AIR-COOLED

K160
6.6 H.P.
Full Power

A Quality Engine for Quality Equipment

Short Stroke
- Less Friction and Wear
- More Power
- Longer Life

Easy Starting

K90.....2.5 to 3.6 H.P.
K160.....3.6 to 6.6 H.P.
K330.....7 to 11.8 H.P.
K660.....12 to 26 H.P.

Kohler Co., Kohler, Wisconsin
Established 1873

KOHLER OF KOHLER

PLUMBING FIXTURES • HEATING EQUIPMENT • ELECTRIC PLANTS
AIR-COOLED ENGINES • PRECISION CONTROLS

For more facts, use Reader-Reply Card opposite page 18 and circle No. 296

20% MORE ROADS

. . . without increasing the budget

Pinellas County, Florida, had a difficult road building and maintenance problem. Fast-increasing population and tourist traffic created an ever-increasing demand for new roads, repairs and rebuilding. At the same time, increased freight rates on aggregates threatened to cut the road building budget in half.

Pinellas County attacked this problem by using locally available aggregate—with a MOTO-PAVER. This combination has enabled the county to build *20% more roads without increasing their budget.*

Moto-Paver does an excellnt job of mixing with any aggregate, whether it be sand, gravel, stone, slag, crushed shells or other "home-made" material—and most types of emulsions, cut-backs, road oils, tars or other bituminous materials.

In all sections of the U. S., and in many parts of Canada, Europe, South America and the Near East, Moto-Paver has demonstrated its ability to speed the job and cut the cost.

See your local H&B distributor or write for Bulletin MP-55.

HETHERINGTON & BERNER INC.
ENGINEERS...MANUFACTURERS
731 KENTUCKY AVENUE INDIANAPOLIS 7, INDIANA

For more facts, use Reader-Reply Card opposite page 18 and circle No. 297

STA-SAFE WINDSOCKS

LOWER WINTER LINER COSTS

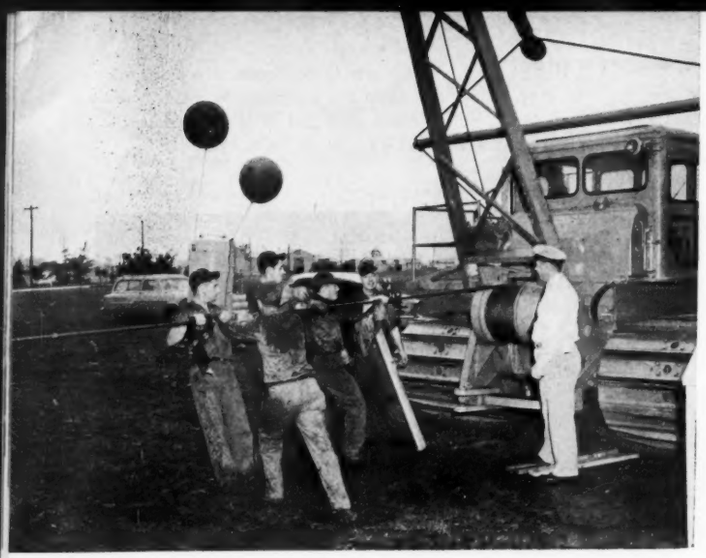
For just pennies per man Windsocks give snug winter warmth. These economical knit caps cost less to buy and less to use. Workers slip on Windsocks, pull them down over ears, put on a hard hat and are off to work. No installation. No adjustments. Nothing to occupy valuable production time. The fit is always perfect since weave expands to all head sizes.

Price is so low, you can throw them away when dirty and still cut costs.

9" length Windsocks $2.64 per dozen
11" length Windsocks $3.00 per dozen

STANDARD SAFETY EQUIPMENT COMPANY
232 WEST ONTARIO STREET CHICAGO 10, ILLINOIS
NEWARK 4, N. J. 597 BROADWAY
CLEVELAND 10, OHIO 855 EAST 152nd ST.
LOS ANGELES 16, CAL. 2952 CRENSHAW BLVD.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 295



Workmen make a dry run with the towing winch on one of the specially built Caterpillar D8 low-ground-pressure tractors which will be used in building Antarctic bases. Crawler tracks on the model have a ground pressure of 4 pounds psi, less than half that of the standard D8.

Winter Work

Seabees will battle winter in Operation Deepfreeze

This month a Navy Seabee battalion 200 strong, with approximately 18,000 tons of equipment and supplies—some of it specially built or ordered for cold-weather use—will begin shoving off for a 14-month construction job in the Antarctic.

Part of Task Force 43's Operation Deepfreeze, the battalion will work under Comdr. Herbert F. Whitney (CEC) USNR, to build three bases and an air operating facility which U. S. scientists will use in the 1957–58 International Geophysical Year expedition under Rear Adm. Richard E. Byrd.

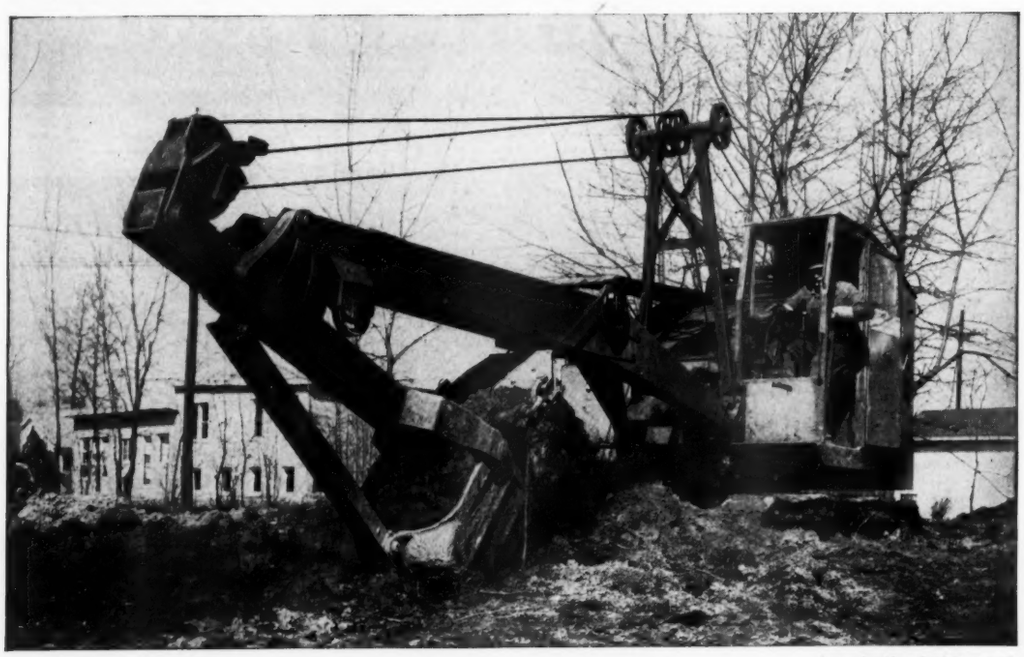
By 1957, the battalion has to complete five major projects. These include a base camp at or near Little America; a base camp plus a site for air operations at McMurdo Sound, 375 miles east of Little America; and two smaller camps. The small camps will be located at Byrd Station, 600 miles west of Little America in Marie Byrd Land, and at the geographic South Pole, 1,500 miles south of Little America.

The battalion's first job on reaching the Antarctic next month will be divided among several individual parties. One will map an overland tractor route to Byrd Station for the reconnaissance party—the first group to go ashore. Almost simultaneously, another party will go ashore near Little America to select a headquarters site. Another party, which will select the site for the air-operations facility, will be put ashore at Mc-

Where parts must be

EXTRA TOUGH

specify **AMSCO® MANGANESE STEEL**



Amsco backhoe bucket at work

Digging! Crushing! Handling! Amsco manganese steel parts work up to 10 times longer under punishment . . . because manganese steel can easily absorb heavy impact and abrasion. Hard work toughens the metal . . . it work hardens to as high as 550 Brinell. The pounding, grating action of rock and ore only polishes manganese steel.

To get maximum life out of your equipment, specify Amsco manganese steel parts from the manufacturer.

DIGGING
backhoe buckets
dippers and parts
repointers
dragline buckets and parts
dragline chain
sheaves
pinions
crawler shoes

CRUSHING
concaves
mantles
jaw plates
mill liners
hammers

HANDLING
bulldozer blades
tractor rollers, idlers
sprockets, grouser bars
truck beds
grizzle parts
ore car wheels and liners
sheaves, gears, pinions

Amsco also produces other alloy steels with maximum wear resistance under particular conditions of service.

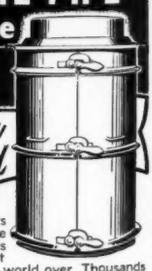
AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Ill.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 298

For the FINEST CONCRETE PIPE You Need the FINEST FORMS!

THE "Quinn" Standard



Backed by over 40 years of reliable service, the QUINN STANDARD is recognized as the finest concrete pipe form the world over. Thousands of pipe manufacturers, from the smallest to the largest, look to Quinn for equipment to produce the finest concrete pipe at the lowest possible costs.

• **QUINN HEAVY DUTY PIPE FORMS**

For making pipe by hand methods by either the wet or semi-dry process. Sizes for pipe from 10" to 120" and larger. Tongue and groove or bell end pipe in any length desired.

WRITE TODAY for complete information and estimates.

Also manufacturers of
QUINN CONCRETE PIPE MACHINES

Quinn WIRE & IRON WORKS
BOONE, IOWA

For more facts, circle No. 299

Equipment specially built for cold-weather operation will be used in 14-month project on Antarctic bases

Murdo Sound from two ice breakers.

Each of these survey parties will be equipped with Caterpillar tractors, air compressors for testing ice conditions, and cargo carriers. In addition, the group at McMurdo Sound will take ashore two dog teams.

Work on temporary facilities will be started immediately, so that equipment and supplies will be handled efficiently when other ships of Task Force 43 make it through the Ross Sea to the Shelf Ice early in January. Temporary quarters for the 60 persons in each wintering-over party at Little America and McMurdo Sound will be made permanent as soon as possible, since ice conditions may force the ships to leave earlier than has been planned.

Work to take longer

As soon as the sites are selected, the snow leveled, and floor joists laid, the 20×48-foot shells will be put up by 14-man crews. These shells can be erected by 15 men in about three hours under normal working conditions, but Lt. Dick Bowers, construction-operation officer in charge of work at McMurdo Sound, expects it will take about twice as long—or about 100 man hours—to erect the shells in the Antarctic, since efficiency drops considerably as the mercury goes down. It is also expected that men will be able to work only an hour at a time, since they will inhale the chill air faster than their bodies can warm their lungs. One thing the men will have to forget right away is the habit of popping a nail or screw into their mouths before setting it to wood, for in subzero temperatures the metal will stick painfully to their skin. But crews will have to use less nails and screws than ordinarily, since a special nickel alloy clip will be used for much of the work.

The shells to be erected are composed of laminations of plywood, aluminum sheet, and spun-glass insulation to a 4-inch thickness. Each 200-pound panel is surrounded at joints with a rubber gasket, which is plasticized to keep it soft at low temperatures. A special tape will seal all cracks inside the building.

When these temporary facilities are complete, work on permanent installations such as fuel-storage facilities, snow-compacted runways, shops, and navigational aids for aircraft will be started. Later, shops and garages, power buildings, GCA, communications, areological, and photographic facilities will be built. At the McMurdo site, a 10-inch-thick ice runway, capable of supporting four-engine aircraft, will be constructed by flooding an area with sea water and allowing it to freeze in 3-inch layers.

Special machines

In all, 24 Caterpillar tractors, 16 Cat electric sets, a 9-ton roller, weasels, sleeping and messing quarters, and two Seaman Pulvi-Mixers, together with items like nylon rope, snow-trail equipment, cold-weather clothing, and food will be used on this expedition.

Ten of the tractors are special Cat D8's of low ground pressure. Supplementing the starting engine of each is a 24-volt ether-aided electric starting system. These machines are winterized for operation in temperatures of minus 65 degrees. Even though the tractor is not operating, an independent system will provide heat to the insulated cabs.

These D8's are considerably different from the standard machine. The low-ground-pressure D8 measures 24 feet 11 inches instead of 16 feet in length. It is 13 feet 4 inches rather than the standard 8½ feet in width. And though the LGP unit weighs 70,000 pounds, its long and wide track will set up a ground pressure of only 4 psi, less than half that of the standard D8.

The cab has a catwalk, shatterproof and tinted glass, a 360-degree spotlight, electric horn, electric windshield wipers, flexible ducting for defrosting, two fire extinguishers, antiglare rear-view mirrors, and an escape hatch at the top.

The machines have track carrier

For more facts, circle No. 300→

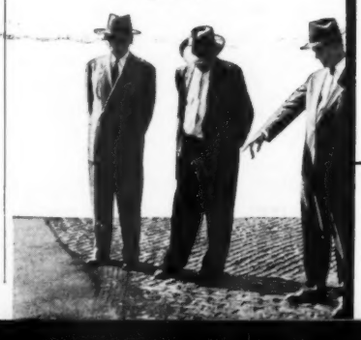
St. Louis makes saving *on paving*

H. C. Halley, Standard Oil Asphalt Engineer (left), and C. G. Gilmore, St. Louis Acting Street Commissioner, observe 10-ton Buffalo-Springfield roller rolling final coat of STANDARD Asphalt Mix. H. C. Halley is an old hand at asphalt engineering. He has been providing technical service on asphalt application for nearly 30 years.

STANDARD

STANDARD OIL COMPANY
(Indiana)

Frank Kriz, St. Louis Director of Streets and Sewers, H. C. Halley and C. G. Gilmore (L. to R.) inspect leveling coat of asphalt mix, part of Compton Avenue resurfacing project.



Resurfaces street with STANDARD Asphalt – saves more than $5.50 per square yard over cost of repaving

IN SOUTH ST. LOUIS, the City Department of Streets and Sewers used STANDARD Asphalt to resurface a brick-paved thoroughfare.

In resurfacing this street, an initial leveling course of STANDARD Asphalt was laid down. This performed three important functions: (1) eliminated irregularities in the surface, (2) provided an even base for the finish coat, (3) provided a uniform thickness of the finish coat. Over this a three inch STANDARD Asphalt mix was applied.

St. Louis Department of Streets and Sewers availed itself of several important advantages when ordering STANDARD Asphalt:

1. It got a handy source of supply. There are five Midwest shipping points for STANDARD Asphalt, one of them only a few miles from St. Louis.
2. Tank car or tank truck deliveries were made from supplier directly to St. Louis paving plant.
3. Ordered from a supplier whose men know road building, are able to anticipate needs, anticipate problems before they occur.
4. Ordered asphalt from a supplier with a demonstrated record of delivering on contracts regardless of current abundance or short supply of road building materials.

You can get these advantages when you buy asphalt from Standard. Find out. In the Midwest, call your nearby Standard Oil office. Or contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois

rails of wood, since rollers tend to plug with snow and ice. Each tractor also has a hydraulically actuated drawbar, which will allow the machines to be directed by hydraulic pressure on the drawbar. Hydraulic dozers and Hyster D8D towing winches are also used on the tractors, four of which will also have Hyster TLA8 cranes.

Additional equipment includes two other D8's, standard but for winterizing equipment, which will be used in air base and runway construction. Nine Cat D2 crawler tractors with D4 engines, for pulling Seaman Pulvi-Mixers and snow dozing, will be low-ground-pressure machines, as will three Cat D4 tractors with fork-lifts, which will be used for loading and unloading aircraft. All electric power for the expedition will be supplied by 16 self-regulating Cat electric sets.

Heavy transport job

Here, on the underside of the world where the seasons are reversed, each station will work from October, 1956, through March, 1957, on a specific assignment. The group at McMurdo Sound will construct Pole Station, and another group will take a Caterpillar train to establish Byrd Station in Marie Byrd Land.

When this work is scheduled to start, the 18th Air Force will make an air drop of 20 men and 350 tons of material and equipment for the project. This will require nearly 100 cargo flights to the pole, since each plane will carry about five tons of equipment. The two biggest items to be dropped will be a Caterpillar D2 low-ground-pressure tractor and a Caterpillar D315 electric set.

Like the rest of the equipment, the 10 big LGP tractors in the train heading for Marie Byrd Land will be painted a bright red-orange for better visibility on the snow. The entire half-mile long train will leave Little America next fall, hauling 550 payload tons, or about 100,000 pounds per tractor. This will be exclusive of the 12×24-foot sleds and the five 24-foot quarters which must go along for crew quarters. Each sled and its contents weighs about five tons. The 30 men making the trek will be divided into 15-man crews, each working 12-hour shifts to keep the train moving 24 hours a day until it reaches its destination. Then this crew, and the crew constructing Pole Station on McMurdo Sound will start the last phase of construction—completion of all base facilities needed by scientists in the 1957–58 International Geophysical Year expedition.

THE END

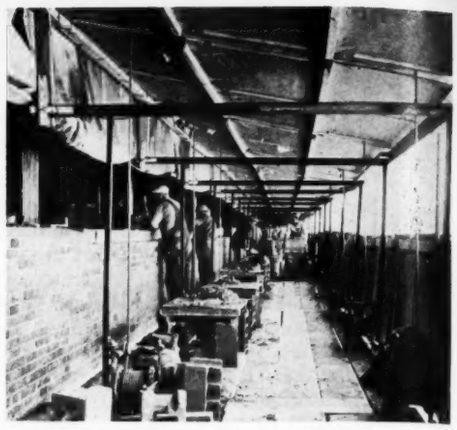
Pavement markers

■ A mailing piece from Reynolds Industries, Inc., gives details on the company's Warco Roadmarkers for use on highways, airport runways, and other areas where directional markings are required. The qualities that reportedly make these devices a highly economical and efficient method of marking pavement and floor surfaces are discussed, and applications of the colored markers are illustrated. Instructions for bonding Roadmarkers to the surface with Warco special high-bond adhesive also are included.

To obtain this literature write to Reynolds Industries, Inc., 4500 Euclid Ave., Cleveland 3, Ohio, or use the Request Card at page 18. Circle No. 78.

American Tractor creates new export sales post

American Tractor Corp., Churubusco, Ind., manufacturer of Terra-Trac crawler tractors, has appointed Robert Fomberg to fill the company's newly created post of export sales manager. He will begin immediately to set up a world-wide TerraTrac distributor organization.



TUBELOX STEEL scaffolding, The Patent Scaffolding Co.'s contribution to profitable cold-weather construction, is enclosed in tarpaulins and plastic windshields on this new switch house under construction for Boston Edison Co. at Allston, Mass. TubeLox scaffolding serves as support for tarps and other protective coverings, permitting complete enclosure of the job if necessary. For further information write to the Patent Scaffolding Co., Inc., 38-21 12th St., Long Island City 1, N. Y., or use the Request Card at page 18. Circle No. 67.

for safety's sake

PUT YOUR LOAD ON
the hook that has never failed

Since its development over 25 years ago, *no one* has *ever* reported the failure of a Coffing Hoist hook under any load or overload. . . . And you'll find the same careful engineering for greater safety . . . the same close attention to detail in every part of a Coffing Hoist, for example:

Safety-Pull Ratchet Lever Hoists have these safety features:

- Ratchet and pawl cannot slip or drop load.
- Handle bends at point of maximum safe overload.
- Handle will not spin or fly up.
- Factory-tested at 100 percent overload.

10 sizes, ¾ ton to 15 tons

Find out more about the Coffing Safety-Pull hoists that are built stronger for safety's sake. Write Dept. C-SP.

Coffing Hoist Division
Duff-Norton Company • Danville, Ill.

Quik-Lift Electric Hoists • Safety-Pull Ratchet Lever Hoists • Differential Chain Hoists • Spur Gear Hoists • Mighty-Midget Pullers • Load Binders • I-Beam Trolleys • Hoists-Alls.

SOLD BY DISTRIBUTORS EVERYWHERE
For more facts, circle No. 301

Hard-Packed Clay

couldn't stop this McKIERNAN-TERRY PILE HAMMER

11B3 Double-Acting Pile Hammer included in the McKIERNAN-TERRY line of 15 sizes of double-acting and single-acting pile hammers and 2 sizes of double-acting extractors.

To prepare the foundation for the concrete spillway of a new Texas dam, many, many piles were needed . . . 2,127 of them. In addition, the piles had to be driven into resistant, hard-packed clay.

It might have been a tough and lengthy job, but not to the powerful, fast-driving McKiernan-Terry 11B3 Double-Acting Pile Hammer wisely selected by the contractors, Reynolds & Williams and Noonan Construction Co.

WRITE FOR BULLETIN

Contractors all over the world have learned from experiences like this that McKiernan-Terry Hammers can always be depended upon for speedy, economical pile-driving jobs.

McKIERNAN TERRY

McKIERNAN-TERRY CORPORATION, Manufacturing Engineers
Also manufacturers of coal and ore unloaders and bridges, grab buckets and special machinery
82 RICHARDS AVENUE, DOVER, NEW JERSEY
MK3800 **Plants: Harrison, N. J. and Dover, N. J.**
For more facts, use Reader-Reply Card opposite page 18 and circle No. 302

The Rockland heavy-duty land-clearing rake.

Heavy-duty clearing rake for all-weather service

■ Durability under the most severe work conditions is claimed for a heavy-duty land-clearing rake manufactured by Rockland Allied Equipment Co., 3778 W. Colonial Drive, Orlando, Fla.

Built for mounting on big tractors (e. g., the Allis-Chalmers HD-21, International TD-24, etc.), the Rockland rake reportedly has been subjected time and again to the toughest land-clearing conditions. Cold snaps and heavy obstacles have failed to impede its efficiency, according to the manufacturer. At present, these rakes are being used for clearing on the St. Lawrence Seaway project.

For further information write to the company, or use the Request Card at page 18. Circle No. 117.

Line of hose and belts

■ Specifications and descriptions of nearly 70 types of rubber hose for a wide variety of construction uses are presented in a catalog digest announced by the Industrial Rubber Division of the Thermoid Co., 400 Whitehead Road, Trenton 6, N. J. Included are several recent additions to the Thermoid hose line.

The brochure also contains data on nine types of conveyor belts, seven types of flat power-transmission belting, and multiple and fractional horsepower V-belts. Cutaway photographs show hose, coupling, and belt construction.

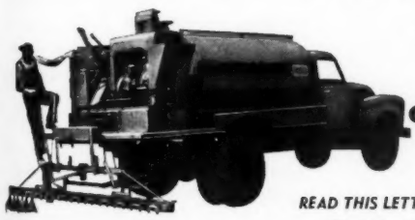
To obtain this folder write to the company, or use the Request Card at page 18. Circle No. 37.

To say that we are well pleased with our

ROSCO DISTRIBUTOR

would be stating it mildly!

Ed M. Knott, Asst. City Eng. Muscatine, Iowa



"One of the Best Pieces of City-Owned Equipment"

READ THIS LETTER from Ed M. Knott of Muscatine:

"Early in the summer of 1951 the City Council of Muscatine purchased a Rosco 1000 gallon capacity Distributor and mounted it on a 1½ ton truck. To say that we are well pleased with our Rosco Distributor would be stating it mildly.

"We started our extensive road program last year and our Rosco was in constant use every day it was possible to work. We seal-coated 150 blocks of City Streets and in addition to this, constructed 36 blocks of road mix asphalt, besides oiling nearly 100 blocks of City Streets.

"During all this time we had only one minor breakdown on our Rosco which was taken care of in less than 2 hours time by our own mechanics.

"All of this work was done directly under my supervision and I feel well qualified to praise our Rosco as one of the best pieces of equipment owned by the City of Muscatine and we own nearly $150,000 worth of street construction equipment of all makes.

"This year we are planning another heavy schedule of street improvements and when we start in a few weeks I entertain no fears as to what our Rosco will and can do for us."

- **Uniform application through exclusive Pressure Metering**
- **Use any length of Spraybar without changing pressure**
- **Accurate, non-clogging, no-streak Vee-Jet Nozzles**

Ask your dealer, or write Rosco for the full story of the Bituminous Distributor with "P.M."—the Pressure Metering Method.

ROSCO-PACTOR

Latest design compaction roller provides positive lap between front and rear tread. 9 and 13 wheel models.

ROSCO MINNEAPOLIS

3118 SNELLING AVENUE • MINNEAPOLIS 6, MINNESOTA

DISTRIBUTORS • MAINTAINERS • BROOMS
SUPPLY TANKS • TAR KETTLES • STREET FLUSHERS

For more facts, use Reader-Reply Card opposite page 18 and circle No. 303

CLOSE...

but not *too* CLOSE...

for a "BABY DIGGER"

Your local distributor will show you how
Clevelands dig more trench ... in more places ... at less cost.

THE CLEVELAND TRENCHER COMPANY • 20100 St. Clair Ave., Cleveland 17, Ohio

CLEVELAND

For more facts, use Reader-Reply Card opposite page 18 and circle No. 304

A blast starts a miniature Niagara of snow and earth as it goes off on a winter construction job. The newest explosives and equipment are largely unaffected by cold, permitting operations to be done on a year-round basis.

Winter Work

Modern blasting methods effective in cold weather

Winter cold has had little effect on blasting operations for a number of years—ever since the same chemical compound used in anti-freeze solution was incorporated into commercial explosives. Even the storage and handling of explosives in winter requires no special precautions, though good normal handling and storing practices still have to be observed. About the only extra handling precaution to be observed is keeping explosives and caps away from open fires, which are common on job sites during this season.

Commercial explosives should remain the same in performance and characteristics in all temperature ranges common to the United States. Gelatin dynamites, though they will not freeze any more than other explosives, do have a tendency to become stiff and to lose their plasticity when exposed to low temperatures. After they are placed in a blast hole, however, this stiffness should disappear, since the temperature of the ground below the frost line remains fairly constant at about 54 degrees F the year around. This hardening of gelatin dynamites in cold weather will not significantly affect their performance.

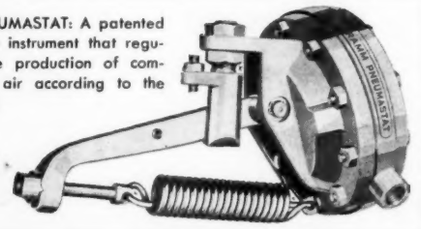
Set dynamite

One danger in cold-weather blasting is that workmen will mistake set dynamite for frozen dynamite, even though frozen dynamite is no longer a problem. Certain types of dynamite may set under adverse storage conditions or when there are wide daily fluctuations in temperature. Setting occurs when warm dynamite absorbs moisture, causing a recrystallization of some of the explosive ingredients when the dynamite cools. In this condition, the dynamite is hard, but its granular form can be restored by rolling the cartridges.

Set dynamite can be easily recognized since it has a dead sound when

What makes SCHRAMM Compressors So Economical *

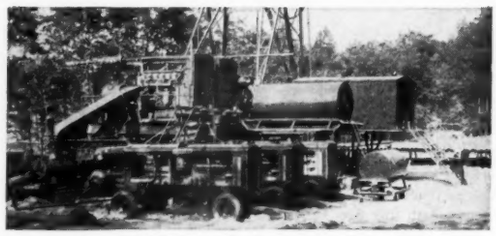
* PNEUMASTAT: A patented Schramm instrument that regulates the production of compressed air according to the demand.



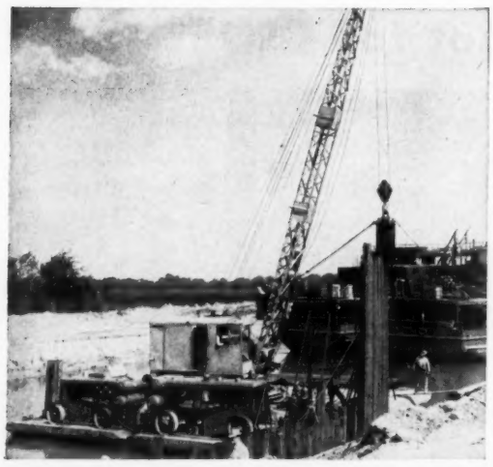
SCHRAMM Unistage Air Compressors have low maintenance and long life... resulting in savings to you... because:

1. Schramm mechanically operated poppet-type intake valves last as long as the compressor.
2. Schramm multiple cylinder construction means less work for each discharge valve.
3. Schramm engines are operated at the speed for which they are designed and not overspeeded to 1800 r.p.m.

Records of Schramm users prove this!



3 Unistage 600 Schramms replaced rotary compressors on gas well and drilling job because of the ability of the Schramms to produce air at high pressures for dewatering and breaking stoppages.



Two Unistage Schramm 315 compressors operating as a unit (630 cfm) furnishing air for pile driving. When not used for pile driving, compressors are available for separate jobs. Pneumastat* controlled Schramms can be operated as a battery without special arrangement and each unit will carry its share of the load.

Schramm air compressors are preferred for Guniting—because of the constant pressure (freedom from variation) and ability to operate any desired pressure for long periods without maintenance.

Schramm compressors replace rotaries on sand blast jobs because of their ability to operate continuously at 125 p.s.i.

Schramm Unistage 600 is ideal for operating two wagon drills. The Pneumastat* controls air delivery to exact requirements of tools used.

Write today for free informative booklet, "Piston vs Rotary Air Compressors."

Schramm, Inc.
MANUFACTURERS OF AIR COMPRESSORS
615 North Garfield Avenue • West Chester • Pennsylvania

For more facts, use Reader-Reply Card opposite page 18 and circle No. 305

Slope Meters Mean *Efficiency Plus* on Your Tractors, Dozers & Graders

Slope Meter installed on your earthmoving equipment increases working efficiency by telling the operator, automatically, the exact crown or slope on which he is working. Slope Meters cut construction costs on highways, airports, dams, and building sites.

Order from your Equipment Distributor today or from
THE SLOPE METER CO. EXCELSIOR, MINN.
For more facts, circle No. 306

tapped with an ordinary wooden pencil. Frozen dynamite, on the other hand, remains hard and, when tapped with a pencil, has a metallic ring.

Blasting supplies

The efficiency of most blasting supplies is ordinarily not reduced if they are exposed to cold. Blasting caps, electric blasting caps, and detonating fuse can be used easily and satisfactorily throughout the winter, though in cold weather, the safety fuse should be warmed before it is uncoiled.

Blasting machines which have electrical generators operate equally well in all kinds of weather. Battery-powered blasting machines may not perform as well, since their batteries may be affected by cold. These machines should be kept warm until they are ready for use.

The capacity of condensers or condenser discharge blasting machines may be slightly reduced by extremely low temperatures. If the reduction in voltage is appreciable with a machine that has an automatic firing switch, the switch may not close to deliver current to the blasting circuit. In this case, again, the solution is to keep the machine warm when it is not in use.

One of the most serious problems in winter blasting work is the effect of low temperatures on galvanometers used to test electrical blasting circuits. Cold reduces the capacity of the special silver-chloride cell furnishing current to operate the instrument, and the chilled batteries make the galvanometers inaccurate. The solution here is to keep the galvanometer warm, and this can be done by keeping the equipment inside the clothing, next to the body.

THE END

Uses of steel scaffolding

■ Applications of its steel scaffolding equipment in construction are discussed and illustrated in a bulletin available from Safway Steel Products, Inc.

Pictured are Safway tubular-steel frame scaffolds, including the new 4×4 scaffolding for light-duty jobs, Safway rolling towers, and other equipment. Features emphasized are the open end frames, which allow unobstructed traffic beneath the scaffold, and the versatility of the product.

To obtain Bulletin A-120 write to Safway Steel Products, Inc., W. State St. and 63rd, Milwaukee 13, Wis., or use the Request Card that is bound in at page 18. Circle No. 200.

DRILLING CONTRACTORS

Diamond and Shot Core Borings, Dry Sample Borings, Grout Holes and Pressure Grouting, Foundation Testing for Bridges, Dams and all Heavy Structures

Leading manufacturers, also, of High-Speed Diamond Drilling Machines and Complete Accessory Equipment, including all types of Diamond Drilling Bits.

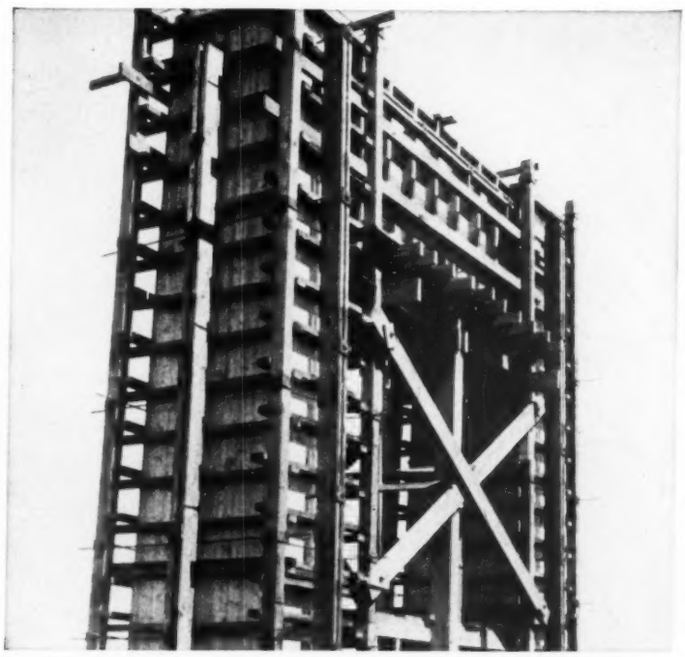
Write for Catalog No. 320

SPRAGUE & HENWOOD, INC.

Dept. C, Scranton 2, Pa.

For more facts, circle No. 307

SUBZERO TEMPERATURES notwithstanding, work on the Ford Motor Co.'s new engine plant at Cleveland continued uninterrupted last winter thanks to half a dozen Dravo Corp. heating units like that pictured above. Mounted on skids along with two 250-gallon fuel-oil tanks, these direct-fired Counterflo heaters needed only a 220-volt power line for continuous operation. Oil was delivered to the units by tank truck. The heaters provided warmth for men, materials, and such operations as concrete pouring and curing. For further information write to Dravo Corp., 709 Dravo Bldg., Pittsburgh 22, Pa., or use the Request Card at page 18. Circle No. 97.

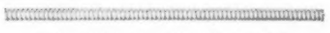


Use of Richmond Adjustable Tyscrus and Lagstuds on This Pier Job Saved the Contractor Money.

Concreting Delays Eliminated by Richmond Lagstuds

Adjustable Tyscru System Means Increased Profits for Contractors

Forced by stiff competition and rising labor costs into closely examining operating techniques, experienced contractors in heavy construction have succeeded in reducing many operational expenses. This has been accomplished by improved techniques and, in large measure, by carefully calculating on-the-job needs and ordering materials and equipment to definite specifications. Yet in most construction areas certain problems must still be solved right in the field. While it is possible in concrete form work, for example, to predetermine accurately 80% to 90% of the tie needs on a job and to order specific sizes, the remaining 10% to 20% present special, unforeseeable conditions. These "specials" were long a headache.

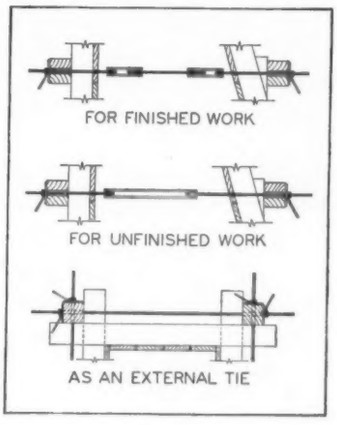


Richmond Continuous Threaded Lagstud

The Adjustable Tyscru System was developed by Richmond for just such emergencies. In the past when special conditions in concrete form work called for a non-standard tie or special rod, the contractor was faced with several alternatives. Once the size was ascertained he could order it from the factory—which meant costly delay; or by using the she-bolt system he could have an inside rod cut and threaded in his machine shop—which also meant that his crew was held up until the piece was finished. Of late years, however, he has been able to use Richmond Continuous Threaded Lagstuds which, combined with Tyscrus, eliminate such delays in operations. By simply cutting a Lagstud to the desired length right at the form, the needed piece is immediately available. The time saved in uninterrupted operations means substantial economies on the job.

Already in wide use by leading contractors, the Richmond Continuous Threaded Lagstud substitutes preparedness for guesswork in planning a job. With a supply of Lagstuds and some miscellaneous Tyscrus on hand, any foreman can quickly and easily assemble a tie to the exact specification. Most versatile of the Richmond Tyscru family, since it can be utilized in scores of combinations with any of the Tyscru products, the Continuous Threaded Lagstud has been used for emergency bolt requirements, for adjustable anchorages in rock or concrete, or—with Lagnuts—for bolting forms together.

The accompanying diagrams illustrate the adaptability of the Richmond Continuous Threaded Lagstud. They are available in ½", ¾", 1" and 1¼" diameters, threaded to fit the contour of the helix coil of the Tyscru.



Safe load rating is equal to that of Tyscrus of the same diameter. Obtainable in 5'-0" standard lengths or cut to length as required.

The entire Richmond Adjustable Tyscru System—Adjustable Tyscrus, Continuous Threaded Lagstuds, Lagnuts and Handle Lagnuts—is described in the 1955 Richmond Catalogue. Write for your copy. Or if you have specific concreting problems Richmond's Technical Division or field men will be glad to lend a hand. Write: RICHMOND SCREW ANCHOR COMPANY, INC.—816 Liberty Ave., Brooklyn 8, N. Y. or 315 South Fourth St., Saint Joseph, Mo.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 308

WEATHER CHARTS

The weather outlook for December

The accompanying four maps, indicating the average number of days with precipitation, the number with snow, and the number of days with minimum temperatures of 32 degrees or less, present the average weather picture for the entire country for the month of December.

Black lines indicate the average number of times that a condition might be expected to occur in a particular area. A weather condition represented by a decimal, such as .5, .25, or .1, may be expected to occur on an average of only once every two, four, or ten years, respectively.

If a contractor in Kansas City, Mo., needs ten days of above-freezing temperatures to pour concrete, the odds are against his completing the job, since Chart 3 tells him that an average of 26 days of below-freezing temperatures are expected in that area. In fact, the odds would be no better than 50-50 that he would have five days of freeze-free weather for the work.

At the same time, the contractor in Pittsburgh, Pa., who has to stop work any time precipitation occurs, had best plan on having to stop work at least 14 days during the month, according to Chart 1.

The data in these charts is not to be interpreted as specific forecasts, but rather as an approximation of what weather conditions might be expected. It is compiled for CONTRACTORS AND ENGINEERS by Weather Corporation of America from weather-station records of fifty cities for the last 60 years or more.

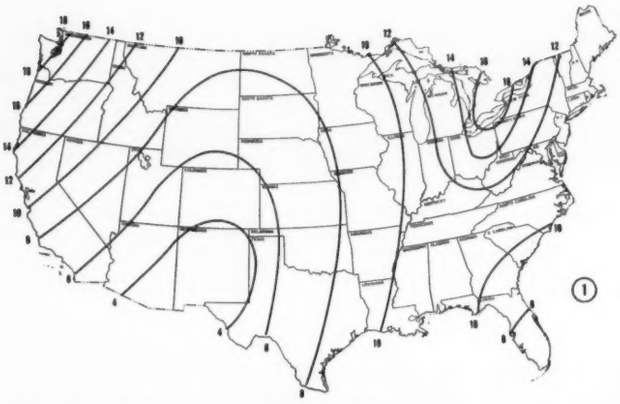


Chart 1. Days with .01 inch or more of precipitation.

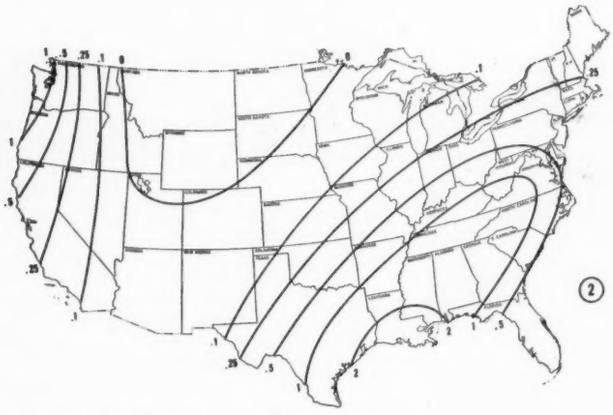


Chart 2. Days with 1 inch or more of precipitation.

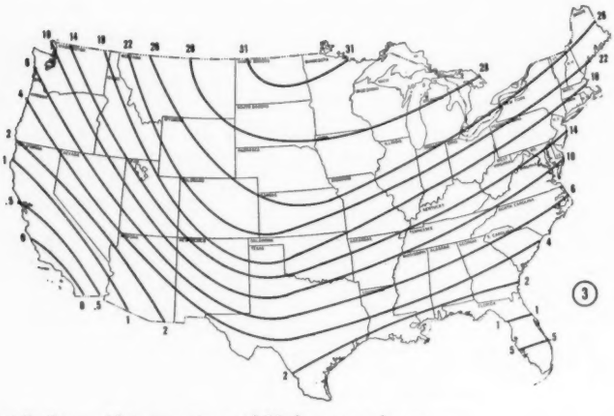


Chart 3. Days with temperatures of 32 degrees or lower.

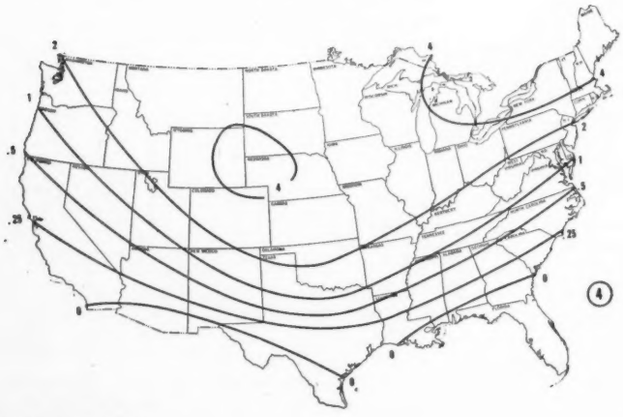


Chart 4. Days with snow.

The Fast, Easy Way To Drill Concrete

ELECTRIC HAMMER DRILL

- Exclusive, Automatic Rotation of Drill Bit
- No Laborious Hand Turning of Drill Chuck
- Continuous Operation—Practically No Maintenance
- Ten Times Faster Than Hand Methods for Drilling

The Only Electric Hammer Drill available with automatic, self-rotating drill bit. Operates at high speed for fast, clean production drilling. Electromagnetic drive—only one moving internal part. Requires little or no service even after constant usage on toughest drilling jobs. Electric Hammer models for chipping, cutting, pointing, scaling, etc. also available.

Other SYNTRON POWER TOOLS That Reduce Job Time and Costs

Gasoline Hammer PAVING BREAKERS and ROCK DRILLS
100% self contained. No air compressor needed. 2000 powerful blows per minute. Dig, tamp or bust paving, clay, shale, etc. Cleans holes automatically down to 13 feet for drilling in rock. Has automatic rotation of drill bit.

Belt Driven ELECTRIC SAWS
Deliver full cutting power to blade—no bucking or jerking. For production cutting of wood, concrete block, plaster board, etc., 8" and 10" blades —2-13/16" and 3¼" cuts.

CONCRETE VIBRATORS
Gasoline or electromagnetic models for uniform compacting and settling on large mass or form concrete projects.

Write today for Complete Tool Catalogue—Free

SYNTRON COMPANY
227 Lexington Ave. Homer City, Pa.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 309

Heat specifications set for Minnesota structures

The first revision of Temporary Heat Specifications of 1953, adopted by the joint cooperative committee of the American Institute of Architects and Associated General Contractors of Minnesota, is designed particularly for new jobs on which the electrical and mechanical contracts are bid directly to the owner.

The specifications call for contractors to provide all heat, fuel, and necessary services to protect their work and materials against cold while the building is under construction, and require a watchman to be in constant attendance when fires are burning.

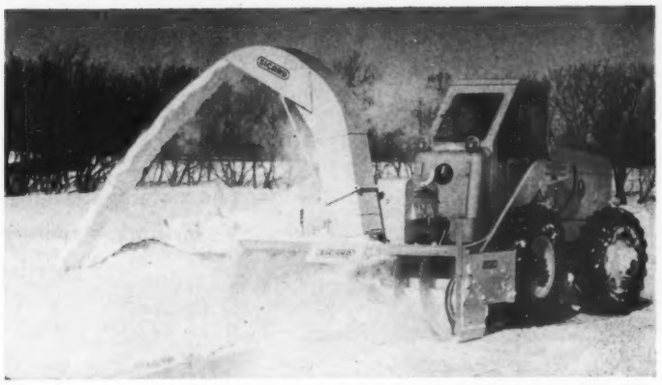
The general contractor is also charged with furnishing the architect and heating and electrical contractors with a construction schedule, shortly after construction begins, indicating when heat from the permanent heating plant will be required. The heating system is under the care of the heating contractor, but the fuel and electricity required is paid for by the general contractor until the building is either substantially completed or partly occupied by the owner.

During the placing, setting, curing of plaster, ceramic tile, and similar material, a minimum temperature of 60 degrees F must be provided inside the building. At least 10 days before interior wood is placed and until the building is substantially completed or partly occupied, heat must be maintained at 70 degrees F. All heating expenses are to be paid by the owner when the building is completed or when it is occupied.

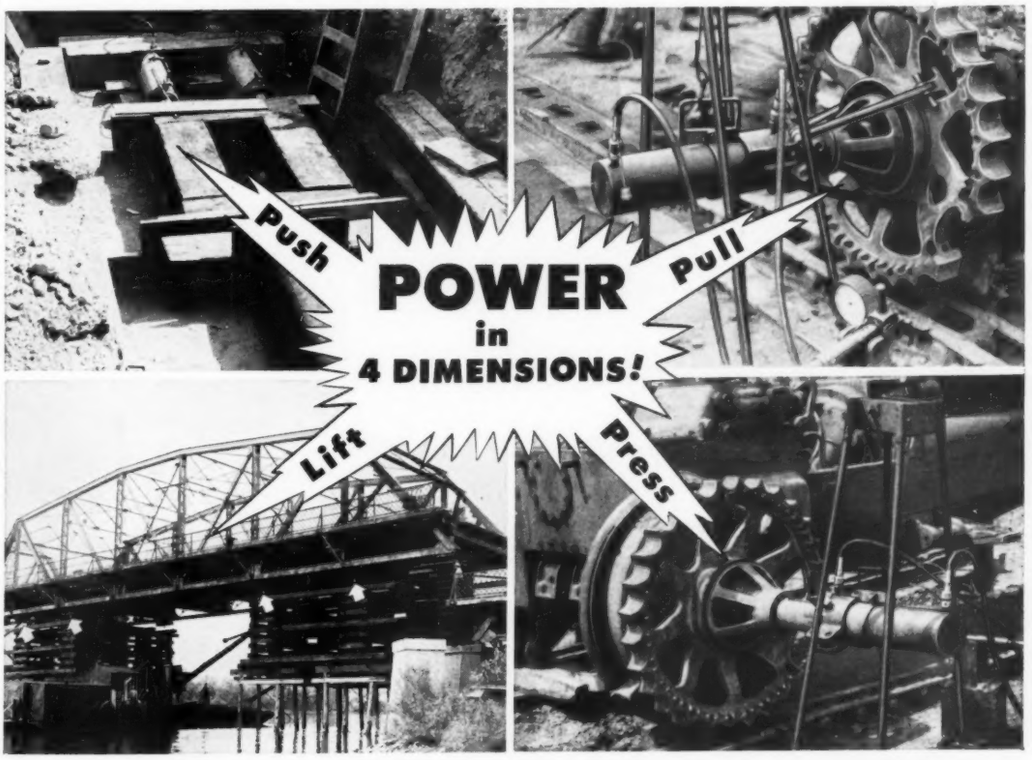
New appointments made by Marion Power Shovel

Marion Power Shovel Co., Marion, Ohio, has appointed William H. McAllister as district manager for the five-state area which includes the western half of Missouri, Kansas, Oklahoma, Nebraska, and Colorado. Mr. McAllister will work with Marion distributors in the district.

P. Ralph Helm, Jr., is now sales manager in eastern Canada for the firm. He will head sales and service organization program in eastern Canada.



REMOVAL OF UP TO 8 TONS of snow per minute is the performance capacity claimed for the Sicard BM Snowmaster, a detachable blower that casts snow close, blows it far, or loads trucks. Mounted on a Hough Payloader (above) or other types of heavy front-end loader, tractor, or truck, the blower may be used in road or street maintenance work, or by contractors to clear yards and project sites. This self-contained auger-type blower has a built-in impeller. Cutting width is 8½ feet and minimum cutting height is 36 inches. For further information write to Sicard, Inc., 2055 Bennett Ave., Montreal, Que., Canada, or use the Request Card at page 18. Circle No. 102.



whatever your job...do it better with

RODGERS HYDRAULIC JACKS

When you need hundreds of tons of sheer power . . . power to push pipe or pull wheels, lift bridges or press sprockets . . . *You've got it* with Rodgers Hydraulic Jacking Units that deliver power in 4 dimensions!

EVERY JOB GOES FASTER, EASIER, at lower cost when Rodgers Jacking Units step in with their steady, precisely controlled power. Single and double acting jacking cylinders in capacities from 50 to 600 tons are available—ram travels from 6 to 48 inches are standard—up to 72 inches optional.

FOR THE REALLY BIG JOBS—like bridge raising—multiple jack installations, working from a single pump and control, deliver uniform power at all jacking stations.

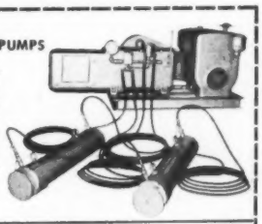
Rodgers Jacking Units—cylinders, hoses, couplers, pumps and controls—are also offered with special attachments for tractor service and tunnel shield work.

PROMPT DELIVERY of Rodgers Hydraulic Jacking Units is usually possible from regional distributors or the factory.

TWO FREE CATALOGS

New Bulletin 321C describes Rodgers Portable Service Jacks for all mechanical pulling and pressing operations. *Bulletin 317A* describes Rodgers Jacking Units and accessories for construction jobs plus facts on typical jacking applications—send for both right away!

POWER DRIVEN HYDRAULIC PUMPS are available with either Wisconsin air cooled engines or electric motors. They produce 2.5 GPM at zero working pressure with a normal working range of 6,000 PSI and will attain momentary peak pressures of 10,000 PSI.



HAND OPERATED PUMPS have three working pump speeds—first, 13 cubic inches per stroke at 3,000 PSI; second, .86 cubic inches per stroke at 5,000 PSI; third, .44 cubic inches per stroke at 10,000 PSI.

Rodgers Hydraulic Inc.

7415 WALKER STREET • MINNEAPOLIS 16, MINN.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 311

ROAD BUILDERS — IT'S SENSATIONAL

DRAGS **PECKERWOOD** DRAGS

STEEL SPRING WIRE ROAD BROOMS

MADE IN ANY C-O-N-T-I-N-U-O-U-S LENGTH UP TO 12 FEET
WIDTH 6 INCHES—IT'S DIFFERENT
ASSEMBLE YOUR OWN—IN ANY SHAPE REQUIRED—IN MINUTES, NOT HOURS

NO FRAME REQUIRED

MADE WITH KILN DRIED 6" WIDE HARDWOOD AND HEAVY SPRING STEEL WIRES TRIPLE OUT EACH HOLE. NOT STAPLE SET.

THIS IS IT — ORDER NOW

ILLUSTRATION OF 10-FOOT LENGTH ONLY **$3.50**

RUNNING FOOT F.O.B. KC., MO.
NOTICE! Our 15" length Unit Drag 3" wide with the two bolts that fit your frame, still $2.50 ea.

SINCE **VAN BRUSH MFG. CO.** 1928
327 S. WEST BLVD., KANSAS CITY 8, MO.
For more facts, circle No. 310

Winter's approach throws

Spotlight on tarpaulins

As protective coverings for work, machinery, and materials

Visqueen plastic film, made by The Visking Corp., protects construction equipment left outdoors during the winter.

■ Wintertime construction — once something of a novelty—is becoming more common each year. The building boom of recent years, coupled with resulting competition among contractors, has demanded that projects be continued even after cold weather, rain, and snow have made their appearance.

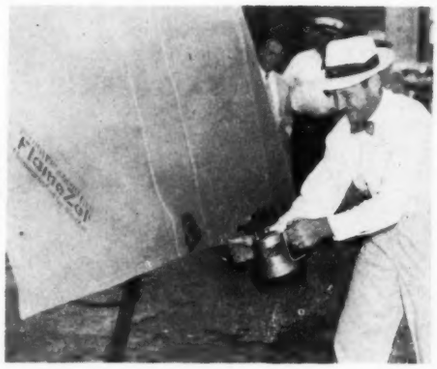
As a result, more attention is being given to the materials which will enable contractors to work without interruption through the winter months. Certainly one of the most important of these is tarpaulins.

These protective coatings are being used widely to enclose winter work on buildings and to cover equipment and materials which must stand outside during the winter. They are finding application, too, in concrete-curing operations.

With the winter months practically upon us, tarpaulin manufacturers are stressing the qualities of strength, versatility, and re-usability in their products. While the majority are offering tarps made of cotton canvas, a few are featuring synthetic materials or experimenting with their use.

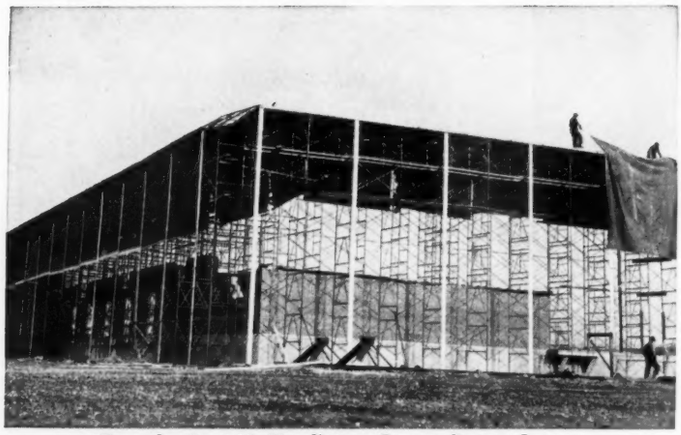
A high degree of fire resistance is claimed for a specially treated tarpaulin manufactured by **H. Wenzel Tent & Duck Co.** Known as FlameZel, this treated canvas product reportedly will not burst into flames even when subjected to severe tests by fire. Applications of a blowtorch at close range have failed to ignite the material; though the flame burns a hole in the canvas, only a small surrounding area is charred and there is no spreading of the fire. The manufacturer also claims that continual exposure to rain and other weathering conditions will not wash out the fire-resistant characteristics of the tarpaulin.

Wenzel also offers RainZel, a low-cost tarpaulin with special water and mildew-resistant qualities, and Alumi-Zel, an aluminum-treated tarp said



▲ Direct application of a blow torch to this piece of FlameZel tarpaulin burned a hole in the material, but failed to ignite the canvas, demonstrating the fire-resistant qualities of the Wenzel product.

No Weather Stoppages Here!



December Start No Handicap to Ragnar Benson, Inc., on Warehouse Construction Job at Whiting, Indiana

Enclosed Safway Scaffold Speeds Mid-Winter Work

Heated for Comfort and Proper Setting of Mortar; Provides Working and Material Platforms

ANY MONTH is a good construction month for Ragnar Benson, Inc., Chicago contractors who built this new warehouse at Whiting, Ind.

Work was started in December. With the aid of a dual-purpose SAFWAY Scaffold, the job rolled along right through the coldest mid-winter months. The scaffolding served both as a platform support and as a framework for the complete enclosure.

To keep workers comfortable and assure proper setting of mortar and cement, the enclosure was warmed with bottle gas heaters. Temporary lighting was also provided.

The masons worked efficiently from a platform mounted on side brackets attached to the scaffold frames. This made it possible to provide bricks, mortar, etc., on a waist-high supply platform . . . thus eliminating tiresome stooping and waiting for materials.

SAFWAY GIVES YOU SAVINGS ON EVERY CONSTRUCTION JOB

For faster, better, safer work, *scaffold every job with Safway!* Safway fits 'em all—summer or winter, large or small, high or low, routine or unusual.

Learn how you can get important savings with this tubular steel equipment. Write today for free illustrated bulletin.

SAFWAY STEEL PRODUCTS INCORPORATED 6240 West State St. MILWAUKEE 13, WIS.

Manufacturers of Tubular Steel Scaffolding and Equipment

RENTED and SOLD by distributors everywhere

For more facts, use Reader-Reply Card opposite page 18 and circle No. 312

Haul Larger Legal Payloads

FASTER . . .
EASIER . . .
CHEAPER . . .

With an OMAHA STANDARD CENTER DUMP TRAILER!

Lower initial cost—less maintenance—faster unloading time—increased payloads. Put an Omaha Standard Center Dump Trailer on the job, and let gravity do the work.

Throughout the United States and Canada, hundreds of contractors are using Omaha Standard Center Dump Trailers for hauling, dumping, spreading and stockpiling all types of flowing materials; — dirt, gravel, shale, rock, sand, chemicals, cement, etc. And they find that it quickly pays for itself.

The Omaha Standard Center Dump Trailer is designed and built to give you greater production at less cost — conforms with all state bridge and axle laws. Illustration shows 10-yd. trailer. Built in all yardages, for any material, single or tandem, for on or off highway. Also available with cross-flow hoppers for spreading. Tell us your problem. Write now for full information.

OMAHA STANDARD FACTORY AND GENERAL OFFICES 2401 W. Broadway COUNCIL BLUFFS, IOWA

For more facts, use Reader-Reply Card opposite page 18 and circle No. 313

to provide 43 per cent greater retention of heat in winter work. All Wenzel tarpaulins feature rope-in-hem construction, giving them greater strength and longer service life, and double sewing at seams, hems, and corners.

For further information write to H. Wenzel Tent & Duck Co., 1035 Paul St., St. Louis 4, Mo., or circle No. 138 on the Request Card at page 18.

Extra-tough cotton duck treated by an exclusive process gives Fultex tarpaulins a wide variety of heavy-duty uses. Manufactured by **Fulton Bag & Cotton Mills**, these durable tarps are sewed with heavy-duty rot-proof thread. Triple sewing at seams and triple reinforcement at grommets give added strength.

The detail of a Hoosier tarpaulin shows the triangular-stitched reinforcing at corners, the double-stitched seams, and hemming on all edges.

In addition to tarpaulins for enclosing work areas, protecting equipment, and other uses, Fulton also offers Fulco concrete-curing mats. These mats are said to hold water longer, thus reducing the time and labor required in curing fresh concrete with the old wet-burlap-and-wet-earth method. Available in pieces measuring $5\frac{1}{2} \times 22$ feet, the mats reportedly are good for many re-uses.

For information about Fultex tarps or Fulco mats write to Fulton Bag & Cotton Mills, 170 Boulevard Elsas S. E., Atlanta Ga., or circle No. 139 on the Request Card at page 18.

A complete selection of heavily-reinforced tarpaulins for use both as windbreakers on building construction and as machinery and materials covers is offered by **Hoosier Tarpaulin & Canvas Goods Co., Inc.** The special feature of Hoosier products is their heavy-duty quality, provided by hemming on all four edges, triangular-stitched reinforcement at the corners, and double-lock stitching at seams. Grommets also are reinforced with extra goods.

Hoosier covers for construction machinery and materials are treated to withstand water and mildew, and are available in flame-resistant material. A wide variety of weights, sizes (including custom-built covers for particular uses), and colors are available. The company also offers tarpaulins for use as concrete-curing mats.

For information on Hoosier tarps write to Hoosier Tarpaulin & Canvas Goods Co., Inc., 1302-10 W. Washington St., Indianapolis 6, Ind., or circle No. 140 on the Request Card at page 18.

Special looming, treatment for resistance to water and rot, and reinforcement are said to be outstanding features of the line of Dandux Penguin tarpaulins manufactured by **C. R. Daniels, Inc.** This closely-woven canvas is said to be impregnated with a fluid which surrounds the fibers and stays there, thus giving the tarpaulin a continuing resistance to the onslaughts of winter weather or other deteriorating conditions.

Dandux Penguin winter enclosure tarps are available in 13 sizes and in five weights. Other canvas products, such as utility covers for equipmen and materials, also are offered by the company. All are triple stitched to prevent leakage of water and to resist rough use.

The Dandux Penguin tarpaulin, product of C. R. Daniels, Inc., encloses building materials on the job site.

For information on these tarpaulins write to C. R. Daniels, Inc., Daniels, Md., or circle No. 141 on the Request Card at page 18.

Webb Mfg. Co. offers tarpaulins in standard and extra-heavy construction for use as enclosures and machinery or materials covers. The standard type has 1-inch lapped seams, double-stitched; a $1\frac{1}{2}$-inch hem; and heavily-reinforced corners.

4 ways to harness 'Jeep' POWER GIANT ruggedness

'Jeep' POWER GIANTS combine their tough ruggedness with real design simplicity . . . to add a new ease in field servicing to their unusually long operating life. Hitch up to this compact, powerful line of POWER GIANTS. Write for bulletins today!

for tough, compact power . . . here's 70 horses in a 2 ft. length.

SAE BELL HOUSINGS AND CLUTCHES

Rugged cast SAE #4 and 5 bell housings support rear of engine. Clutch assemblies including splined disk and clutch for low cost coupling available.

SPEED REDUCERS

Incorporates over center clutch, PTO and reduction gears. Ratios from 1.37 to 3.9 to 1.

POWER TAKE-OFF

Direct drive with positive engaged and disengaged positions. Close adjustment of clutch without special tools.

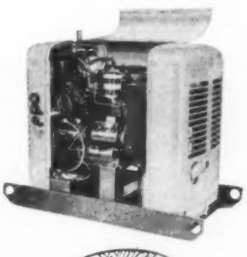
AUTOMOTIVE TYPE TRANSMISSION

Installation includes automotive type bell-housing, clutch and transmission. An economical speed reducer, using production parts.

for special needs, please inquire

Versatile POWER GIANT Power Unit

Complete from radiator to flywheel, this complete 'Jeep' Power Unit can be supplied with any POWER GIANT Engine. Each unit is ready to operate at time of delivery.



Write for: 4 Cylinder Bulletins
Power Unit Bulletin

WILLYS MOTORS, INC. Industrial Engine Department
1505 N. COVE BLVD. TOLEDO, OHIO

For more facts, use Reader-Reply Card opposite page 18 and circle No. 314

The extra-construction tarp has 2-inch hems double lock-stitched and reinforced with rope, and is recommended for use where there is extra strain on tie ropes and grommets.

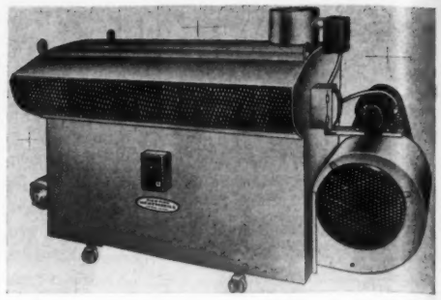
All tarpaulins manufactured by Webb are Weathermune-treated for resistance to water and mildew. A special Noblaze fire-resistant treatment is available at extra cost. All products of the company are tagged in accordance with National Bureau of Standards' specifications.

For information about Webb tarpaulins write to the Webb Mfg. Co., Fourth and Cambria Sts., Philadelphia 33, Pa., or circle No. 142 on the Request Card at page 18.

A plastic film recommended for enclosing windows on building projects and especially for covering construction machinery exposed to the elements is offered by **The Visking Corp.** This product, known as Visqueen film, is manufactured in 4-mm and 6-mm thicknesses, with seamless widths up to 32 feet. Either clear or opaque black film is available.

Because the Visqueen film is reusable, the low initial cost of this protective material is said to represent even more of an economy. One contractor estimated that it cost him $7 per machine, the initial cost of the Visqueen cover, to protect his equipment spreads last winter from the elements, and he expects to use the coverings for many winters to come.

For information about Visqueen film write to The Visking Corp., P. O. Box 1410, Terre Haute, Ind., or circle No. 143 on the card at page 18.



The Model 101 Heatmobile, made by the Siebring Mfg. Co., George, Iowa.

Compact mobile heater features high output

■ Low initial cost and high operating efficiency are claimed for the Siebring Model 101 Heatmobile, a compact unit which produces heat instantly upon being plugged into any 110-volt ac outlet.

This portable heater is recommended for contractors' use either on outdoor jobs where materials and men must be kept warm, or indoors on building projects. It is easily moved from one spot to another, since it is available mounted on either 3-inch wheel casters, semipneumatic rubber-tire wheels, or a standard auto trailer mount.

Designed to deliver 202,500 Btu per hour on 1½ gallons of fuel, the Model 101 has nozzles interchangeable to burn from ½ to 1.65 gph. The heater is enclosed in a cabinet 31⅜ inches wide, 36 inches high, and 48 inches long.

For further information write to Siebring Mfg. Co., George, Iowa, or use the Request Card at page 18. Circle No. 58.

Folder on new scraper

■ Engineering, design, construction, and mechanical features of the new Allis-Chalmers TS-360 motor scraper are outlined in a new catalog available from the Construction Machinery Division, Tractor Group, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Photographs and drawings emphasize the advantages claimed for this heavy-duty earthmoving unit, which has a 20-cubic-yard-heaped or 15-cubic-yard-struck-capacity scraper powered by an Allis-Chalmers 280-hp diesel engine. Operator comforts said to add to the productivity of the TS-360 are also outlined, and complete specifications of the unit are included in the literature.

To obtain Bulletin MS-663-557 write to the company, or use the Request Card that is bound in at page 18. Circle No. 24.

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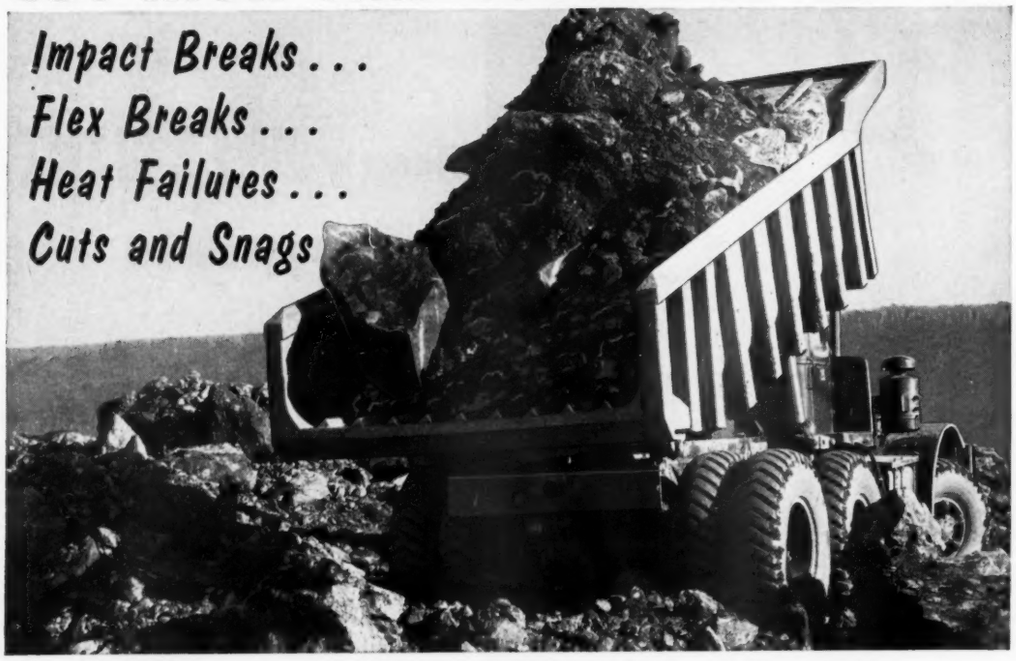

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FIRESTONE Nylon Off-The-Highway Truck Tires are built to deliver more hours of service on the toughest rock work, earth moving or strip mining job.

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For more facts, circle No. 316

The Goldak Model 620 valve locator being used to locate a valve head in frozen ground.

Pipe locators simplify winter excavation work

■ Time and money spent in doing subsurface repair work and in excavating around water mains and other facilities may be kept to a minimum by using pipe, valve, and leak locators manufactured by The Goldak Co., 1544 W. Glenoaks Blvd., Glendale 1, Calif.

Particularly are these instruments said to be valuable in parts of the country where the "freeze line" extends down several feet. Wintertime excavation in this frozen ground means longer, harder work and greater labor costs; hence it is important to hold digging to a minimum.

The Goldak locators are said to pinpoint the exact location of pipes, valves, and leaks in pipes. These compact electronic devices are one-man operated.

For further information write to the company, or use the Request Card at page 18. Circle No. 124.

Austin names engineer

William A. Loumos has been appointed district engineer for the eastern district of The Austin Co., engineering and building firm of Cleveland, Ohio. He has served in the district since 1939 as an architect and in several engineering capacities. His headquarters will be in Roselle, N. J.

In a Hayward, there's no contact between the closing mechanism and the material handled. This "no contact" feature is a very important one to you—since it means much less wear, reduced upkeep, and a significant dollar-saving in bucket maintenance.

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CLAM SHELL • ELECTRIC • ORANGE PEEL • GRAPPLES
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For more facts, circle No. 317

REVERSE INSULATION is provided on this air force hanger project at Thule, Greenland, by 4-inch-thick blocks of Foamglas incorporated in the concrete floor slab. The cellular glass insulation keeps building heat from thawing the frozen ground which serves as a base for the floor slab and which, if thawed, would allow the building to settle and perhaps collapse. The insulation has a compressive strength of more than 7 tons per square foot, enabling it to carry both the concrete slab and heavy machine and manpower loads. For further information write to the Pittsburgh Corning Corp., 1 Gateway Center, Pittsburgh 22, Pa., or use the Request Card at page 18. Circle No. 96.

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Available in 200, 300, 400 and 600 amperes, it is a superior direct current welder using Miller Unitran transformer control and selenium rectifiers for conversion from 3 phase AC line current. Miller SR Welders feature widest possible current range, extreme arc flexibility, maximum electrode deposition rate and highest electrical efficiency.

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A new concept in welder design for all DC metalic arc welding. Available in 200, 300 and 400 amperes. It is ruggedly constructed, compact, and is designed to lend itself to stacking for parallel operation or to conserve floor space. It has single range control and is weatherproof.

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These Miller Welders feature the patented Miller UNITRAN control circuit which combines the transformer with its own integral flux diverter. This, in conjunction with adequate open circuit voltage, high frequency, balancing resistor and optional controls insures superior uniformity and flexibility throughout the entire welding range. Available in nine models.

THE *New* MILLER MULTI ARC COMBINATION AC-DC WELDER

Available in 14 models, this new Miller Welder provides both AC and DC welding power for applications where both are required. It operates from a single phase power line and is available with high frequency and controls designed especially for inert gas arc and spot welding.

MILLER 100 SERIES HEAVY DUTY INDUSTRIAL TYPE AC WELDERS

Designed for heavy production welding and automatic welding applications. Available in eight models. The 100 Series Welders permit faster welding—as much as 35% faster. Movable coil design and 80 volts O.C.V. produces uniform and better welding characteristics throughout the entire range of the welder.

Write today for complete information on these Miller Welders.

ARC-SPOT miller GENERATORS WELDERS

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ELECTRIC MANUFACTURING CO., INC.
P.O. Box 798 Appleton, Wisconsin

"... if it's MILLER you know it's the finest..."

For more facts, use Reader-Reply Card opposite page 18 and circle No. 318

Compact trencher

■ Its new Model 155 Trenchliner is described and illustrated in a bulletin from the Parsons Co.

Available in either gas or diesel powered models, the unit is 7 feet 4 inches high and 5 feet 4 inches wide, and thus is reported to work in congested areas normally inaccessible to a trencher of the same capacity.

The 155 Trenchliner is said to produce from 5.8 inches to 12.75 linear feet of trench per minute, with a range of 30 digging speeds selected by lever control. With simple sprocket change, a higher range of speeds is made available to produce a maximum of 25 linear feet of trench per minute. Maximum trench depth for the Model 155 is 8 feet, with widths ranging from 16 through 26 inches.

To obtain this literature write to the Parsons Co., Box 431, Newton, Iowa, or use the Request Card at page 18. Circle No. 100.

Allis-Chalmers Personnel

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis., has appointed N. W. Landis and A. J. Mestier, Jr., managers of sales districts in New York and Detroit, respectively. V. L. Spinney will be A-C's district manager of the central region, with headquarters in Cleveland, Ohio.

John W. Becker, sales representative for A-C, has been promoted to manager of Syracuse, N. Y., district. Mr. Becker joined the firm upon his graduation from the University of Nebraska in 1948.

HEAVY RAINS, resulting in muddy conditions like that above, are symptoms of winter in many parts of the country. To extricate a bogged-down haul truck, this contractor is using a Hyster winch mounted on the rear of a tractor. According to the manufacturer, Hyster tractor winches increase tractor pulling power up to 92 per cent over regular drawbar pull. Flexibility in towing operations is achieved by unspooling the winch line while the tractor moves to firm footing. For fruther information write to the Hyster Co., P. O. Box 4318, Portland 8, Oreg., or use the Request Card at page 18. Circle No. 89.

New hose springs back after being crushed

■ A new water-suction hose that springs back to its original shape if run over by a truck or other heavy machinery has been announced by the industrial products division of The B. F. Goodrich Co., Akron 18, Ohio.

Called Morecon, the new hose is a continuous coil of hemp rope, specially treated and imbedded in thick rubber. Medium-weight fabric plies are wrapped around the hose to support end-pull or tugging action in suction service.

The hose is recommended to handle normal suction with maximum working pressures ranging from 70 pounds in the one-inch size to 40 pounds in the 3-inch size. A corrugated cover of tough black rubber resists sun-checking, abrasion, and the effect of aging. The Morecon hose tube is a smooth nonporous rubber that handles gritty and mildly corrosive fluids. It is available in 1, 1¼, 1½, 2, 2½, and 3-inch sizes.

For further information write to the company, or use the Request Card at page 18. Circle No. 90.

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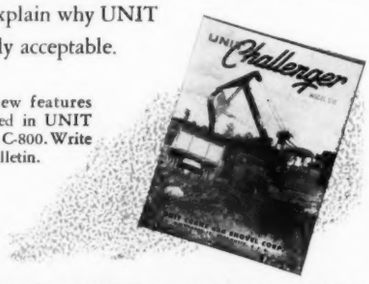
See the many other new features illustrated and described in UNIT CHALLENGER Bulletin C-800. Write for your copy of this bulletin.



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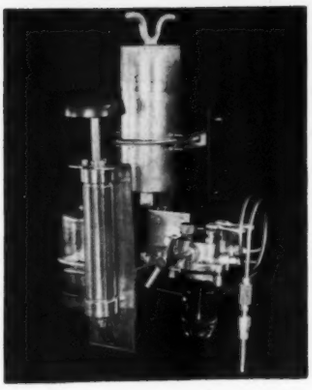


QUICK STARTING in temperatures as low as 40 degrees below zero is said to be assured with the Ampco-Sinclair engine starter, which automatically meters the proper amount of starting fluid to begin normal fuel firing in cold engines. Starting fluid stored in the supply chamber (top, center) is fed to the fluid-measurement chamber (bottom, right). The air-supply tank (background, left) is pressurized by the air-supply pump (foreground, left). Then, with the engine fuel throttle in "run" position, the control valve (front handle atop the fluid-measurement chamber) is opened and starting fluid mixed with air passes through the spray hose (right) and into the engine. For further information write to either Sinclair Refining Co., 600 Fifth Ave., New York 20, N. Y., or to Automotive & Marine Products Corp., 87 Harvard Ave., Boston 34, Mass. Details may also be obtained by circling No. 126 on the Request Card at page 18.

Data on slip-form paver

■ The Quad-City slip-form concrete paver, a new unit which eliminates the need for side forms in laying concrete pavement, is described in an illustrated folder. Drawings and photographs show the features and operation of the machine.

According to the literature, the Model SF-25-B paver employs tampers, screeds, and a finishing belt to thoroughly compact the concrete. This heavy-duty compacting setup reportedly stabilizes the edges of the slab so that no side forms are needed. Slab width is adjustable from 20 to 25 feet, and slab depth from 0 to 10 feet.

Mounted on 22-foot crawlers, the machine is powered by a 10,000-watt engine generator. Two totally enclosed motors deliver more than 100,000 inch-pounds of torque to the drive sprocket of each crawler tread.

To obtain this folder write to Quad-City Equipment Co., 646 25th Ave., Rock Island, Ill., or use the Request Card at page 18. Circle No. 39.

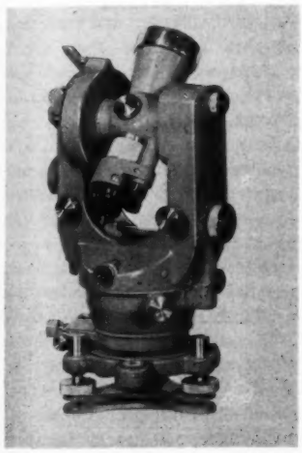
Warner & Swasey to buy assets of Duplex Truck

An agreement by which the assets and business of the Duplex Truck Co., Lansing, Mich., will be purchased by the Warner & Swasey Corp., Cleveland, Ohio, has been placed before the board of directors of Duplex.

Duplex, a division of Warner & Swasey, will continue to make trucks, undercarriages, and generator sets.

New surveying transit for greater precision

■ A recent addition to the Wild Heerbrugg line of transits is the new Wild T-1 optical repeating instrument, which permits direct readings to 20 seconds and easy interpolation to 10 seconds on both horizontal and vertical circles.



The new T-1 optical repeating transit made by Wild Heerburg Instruments, Inc., Main at Covert Sts., Port Washington, N. Y.

While the standard Wild instrument reads directly to 1 minute with estimations to 6 seconds, the new model's minute graduations on the micrometer scale are subdivided into three units. The feature permits greater precision in survey work.

For further information write to Wild Heerbrugg Instruments, Inc., Main at Covert Sts., Port Washington, N. Y., or use the Request Card at page 18. Circle No. 134.

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710 North Brookfield, South Bend 28, Ind

For more facts, circle No. 321

How Beth-Cu-Loy drainage pipe made this job easier

On this job the pull shovel that dug the trench doubled in brass as a hoist, in laying a section of 36-in. storm sewer. No need for a feather bed here, for this pipe was fabricated from galvanized Beth-Cu-Loy steel: tough enough to make mollycoddling needless, flexible enough to conform to irregular grade conditions.

A Beth-Cu-Loy drainage installation can be counted on to last the lifetime of the project. It can flex longitudinally or transversely to absorb changing loads caused by shifting soils or freezing action. Thus it can withstand greater impact and vibrational stresses than rigid materials.

Beth-Cu-Loy steel is extra-resistant to corrosion because it contains 0.20 to 0.30 pct copper. The galvanized coating is of Prime Western zinc and will satisfy the 2-oz triple spot test required. Culvert pipe made of Beth-Cu-Loy fully complies with the American Association of State Highway Officials and Federal Specifications adopted by most states.

Bethlehem manufactures the Beth-Cu-Loy galvanized corrugated and flat steel stock used by pipe producers. If you would like to have further information about Beth-Cu-Loy, or the names of those who fabricate it into pipe, just get in touch with the nearest Bethlehem office.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

For more facts, use Reader-Reply Card opposite page 18 and circle No. 322

Here's a typical example of a compaction trick. This contractor uses surface plowing as an aid in aerating a wet borrow pit. When this soil goes on the dam it will be at optimum moisture content and won't interfere or slow down other hauling and rolling units.

Mixing: compaction's close relative

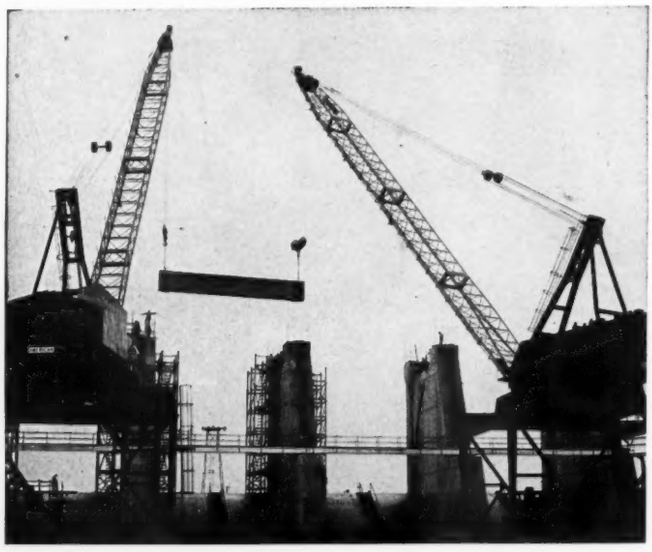
by EARL B. MALOON, Manager
Construction Machinery Division
Southwest Welding & Manufacturing Co.
Alhambra, California
and RAY DAY

There's a saying that a chain is as strong as its weakest link. Nothing ever applied with more vigor to the science of soil compaction than this, particularly with reference to the frequently forgotten link of soil manipulation. Call it blending, call it the assembly of materials, call it even moisture dispersion or what you will, the business of blending soils with the proper moisture content is an all-important part of compaction.

It's a practical impossibility to develop densities of the high-class order without manipulation of some kind. The better the manipulation is, as a rule, the better the densities are. There's no greater offender in the development of a really high-class fill than the business of placing moisture on the surface of a thick lift, and expecting it without help to absorb evenly throughout that material.

The alternate wet and dry streaks in a fill of that type are simply bound to give trouble. Nothing causes design engineers more worry. Probably nothing on a fill interferes more with orderly work, high production of hauling equipment, and dirt costs. The mechanical manipulation of a soil structure with moisture costs money, but under many or most conditions it seems well justified.

One of the hardest, most stubborn soils to compact anywhere in the West is the powder dry, fine desert soil on Nellis Air Force Base, Nevada. It sheds water like a duck's back. Two years ago this airfield underwent a construction program in which really high-type densities had to be specified by the U. S. Army Corps of Engineers and the U. S. Air Force. Gibbons & Reed of Salt Lake City, one of the best known general contractors of the Rocky Mountain area, held the contract. Even before Gibbons & Reed moved in, the use of 50-ton compactors was a foregone requirement, and the contractor had ordered a Southwest C-50. But even with the high-compactive capacity of this equipment, the contractor's man-



A 35-TON precast and prestressed girder being lowered into place in the north row of girders for the spillway bridge.

Unique Vibrator Mounting Enables Spillway Contractor to Vibrate Portion of Girder Impossible to Reach Internally

• **Contractor's ingenuity** has been an important factor in precasting and prestressing operations of the 32-span bridge of massive Garrison Dam which cuts off the Missouri River channel at Riverdale, North Dakota. Precasting and prestressing, although only a small part of the $13,300,000 stage I spillway contract, presented unexpected problems in placing the concrete.

• **The huge concrete slab** of the spillway chute was used as a casting bed for precasting and prestressing by the contractors on the project, Johnson, Drake & Piper, Inc.; C. F. Lytle Company; Foley Brothers, Inc.; Winston Brothers Company, and Donovan Construction Company. Among the many members cast on the job, were 64 girders, 47.33 feet long and 6 feet high. Viber Model PX high speed pneumatic external vibrators were used underneath on the first ten to twelve inches of concrete. It was impossible to reach this concrete with internal vibration due to the seven cables that fill the seven inch web.

• **A novel rig** for mounting external vibrators was so portable that the contractor was able to place this concrete with two VIBER Model PX external vibrators. As concrete was placed, the jack and vibrators were rolled under the girder form between timber supports. Raising the jack forced the vibrator to bear against the form, vibrating the mix. Through use of this rig, the vibrator could be quickly shifted to another position against the form or rolled to the next pour.

• **For further information** on Viber's complete line of internal and external vibrators, contact your authorized distributor or Viber Company, Dept. 77, 726 South Flower Street, Burbank, California.

A WORKMAN opens the valve to start a VIBER pneumatic vibrator held against the lower flange of a girder form by a Blackhawk floor jack. This external rig can be quickly moved to another location.

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Your roller will do more if you pay more attention to better, intimate mixes of soil and moisture

agement decided to buy and use a Seaman Pulvi-Mixer. Long familiar with soils and their compaction, these men simply believed that proper assembly of this soil structure, with the right moisture content, would let the compactor deliver its ultimate rolling capacity. The assumption was wise. As soon as this mechanical manipulation went into effect, the compactors were able to handle heavier lifts by three inches than before. The number of passes required to develop the 95 per cent modified AASHO requirement was reduced from six to four. It was a clear-cut case where the expenditure of preassembly money was justified many times over.

One of the top soils officials of the Corps of Engineers had this to say about such preassembly of a soil structure:

"In about 95 per cent of the cases where we've specified the use of this equipment prior to rolling, the results we wanted were definitely insured, and the contractor made money on his fill. There are a few soils—certain stiff clays, for example—which don't seem to justify the financial expenditure of pre-manipulation. But the big majority of soils do; there are few exceptions."

Soils men, familiar with the fundamentals discussed in the previous installment on this subject, will be quick to grasp why soil blending boosts the compactive effort of any rolling equipment. The compaction of soils was defined as a simple process in which little soil particles were forced between big soil particles to densify the mass. These little particles fill the voids without affecting the volume of the soil structure. It's like pouring peas over a bushel of potatoes. The peas go down in the voids without causing any of the potatoes to overflow the basket.

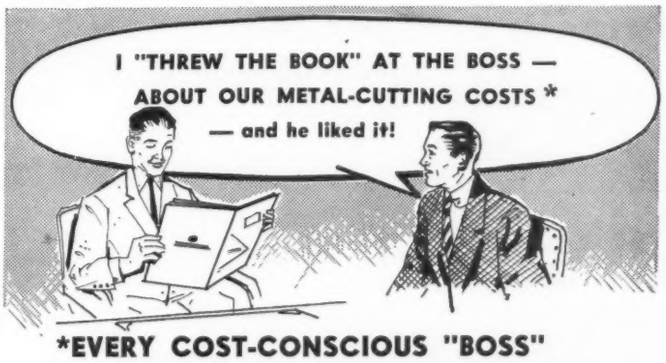
The proper blending of a soil with moisture, prior to the compaction rolling, simply coats each soil particle with its water lubricant, making it easy for the little pieces to slide between the big ones. If, in the blending process, the soil assembly machinery mixes or disperses soil particles to some extent, so much the better. That obviously prevents the segregation of pockets of coarse or fine material.

Various methods used

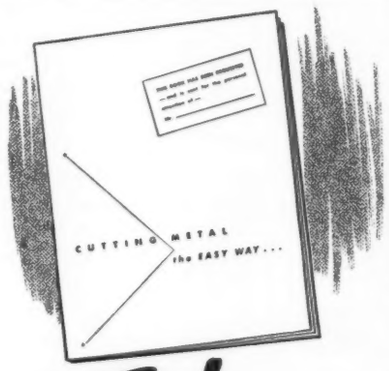
Any contractor, superintendent, fill foreman, a respected and mature inspector, or an operator who has seriously attempted to learn about soils can do a great deal on his own job to help out along these lines. In some cases, for example, mechanical loading in the borrow pit can be done in such a way that the soils are mixed to a very great extent. The use of

(Continued on next page)

Water sprinkling like this is essential to good compaction, because only by getting the right amount of moisture around the soil particles will they slide readily into place.



*EVERY COST-CONSCIOUS "BOSS" WILL LIKE THIS BOOK — if his company cuts any of these materials! —



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The contractor who had this Seaman Pulvi-Mixer on his job in Texas was able to aerate a rainsoaked fill rapidly. Processing equipment on a fill thus aids compaction.

(Continued from preceding page)

sheepsfoot rollers to break clods also does some mixing. It is frequently possible at little cost to pre-wet a dry borrow pit so that practically all the optimum moisture content is on the soil particles when they come out of the borrow pit. The opposite also is true: Last summer at Cherry Valley Dam in California, for example, the impervious borrow pit was extremely wet, so Guy F. Atkinson Co., the Contractor, aerated and dried large areas of the pit with crawler tractors and heavy-duty moldboard plows.

In many cases, rotary mechanical mixing is used, both for mechanical aeration and for roadmixing a soil mechanically at high speed with its proper moisture content. One of the late multi-purpose developments is the use of a giant ripper, such as the Southwest RXH-3, to loosen a borrow pit prior to water application. Development of really high drawbar tractors like Caterpillar's D9 has made these big rippers practical. The RXH-3 will penetrate 36, 42 and 48 inches. And with a single center standard it can go to 60 inches.

These high-class measures obviously apply to high-class fills. It may well be, however, that the high cost of modern structures may soon force a realization that low-cost fills are about the most expensive thing an engineer can put in any structure—even a secondary highway. For the county roads of today become the secondary roads of tomorrow, and they in turn become the primary highways of the next era, particularly if they're on anything like the permanent alignment they should be. It's simply not economical in dirt work to save a few dollars on compaction and run the risk of losing an expensive pavement, having a building settle, or losing a bridge pier.

Frequently, at little or no effort, the practical construction man on an earthfill can do much in his own right to boost the quality of compaction. Most of these little tricks previously were discussed. They included such things as an awareness of weather and how it affects the moisture in a fill. The tendency for an optimum moisture borrow pit to dry out excessively on a hot, windy day is well known. So is the tendency for an optimum fill to pick up excess moisture during a cold, foggy night, or in a rain. The ability of modern pneumatic rollers to seal the surface of such areas quickly ahead of a rain makes it easy for the intelligent fill foreman to minimize the delays weather causes on his job.

An intelligent appraisal also will indicate many times that soil processing can be done to the over-all advantage and profit of the job. It is not at all infrequent to find a crew struggling hard, with a subsequent slow up of production, trying to meet tough compaction specifications. Analyze the job carefully and you often see the men and equipment which would get those requirements not only on the payroll, but are there in unproductive fashion.

Adverse conditions

There will be times, despite the best intentions and abilities of any man, however, when compaction will have to be done under adverse conditions. There are places where high-type fills have to be built where water is practically nonexistent, or where water hauls up to 20 miles one way have to be made. Obviously, under these conditions, anything which will develop the proper degree of density under dry-side compaction will be welcome. There are other places where a borrow pit on the wet side combines with the run of bad weather to hold up a job that's badly needed. That has happened on many of the military installations around the country, which were built practically under crash conditions. In many spots, too,

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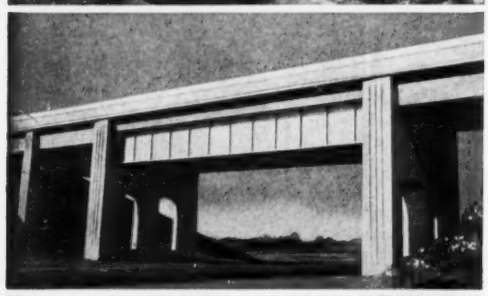

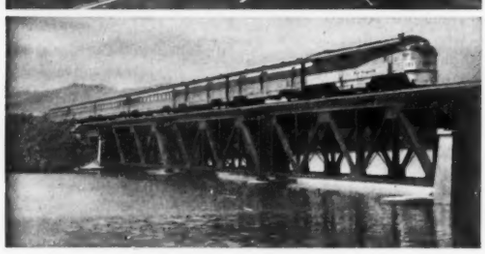

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there are other adverse factors: for example, the compaction of material to high density which contains a large volume of rocks. Picking rocks out of a fill, particularly by hand labor, is one of the most expensive items any contractor can be cursed with.

There are fills, too, where despite leveling dozers and everything else the surface becomes rough. While it's unpardonable to let a fill surface stay rough, it frequently is necessary to do compaction work on such a surface, so that the fill can be leveled off.

It was the advent of the modern heavy-duty pneumatic roller which corrected practically all these adverse conditions at one fell swoop. Modern heavy-duty pneumatic equipment has proved beyond a doubt its ability to compact soils on the dry side of optimum if thin lifts and care in spreading is exercised. These rollers also have demonstrated proved ability to compact material on the wet side of optimum. Nothing to this time has ever been found which will squeeze moisture out of soil and relieve pore pressure as much as the pneumatic roller. Fills with cobbles present never were a problem to the pneumatic roller. As a matter of fact, one of the first favorable features noticed about the pneumatic roller was its ability to get good densities in thicker lifts, so that ordinary cobbles no longer needed to be a problem in that regard.

Heavy-duty pneumatic rollers also have demonstrated another definite compaction benefit. Because of their extremely heavy over-all weight, these rollers have shown a definite tendency to improve densities deep below the surface of the ground. A pneumatic compactor, moving along the surface of an earthfill, not only is developing extremely high densities close to the surface of the ground; it's also boosting the density of soil from 2 to 2½ feet below the surface. Thus, the use of this equipment on the raw ground in the surface of a cut, or on virgin ground, is a definite asset regardless of whether a dam goes on that ground, a highway, a building, or some other structure.

(This is the second of three articles on compaction. Part III will appear next month.)

Improved sewer pipe

■ A new and improved type of sewer pipe has been announced by Armco Drainage & Metal Products, Inc., Middletown, Ohio. Smooth-Flo pipe is reported to have all the structural advantages of corrugated metal pipe plus the flow capacity and the extra durability of a completely smooth, centrifugally spun bituminous lining.

Developed especially for sewer uses, the pipe is recommended for storm, sanitary, or combined sewers. It is said to offer a flow capacity equal to or better than other sewer pipes of like size, while retaining the advantages of the flexible type of pipe.

For further information write to the company, or use the Request Card at page 18. Circle No. 196.

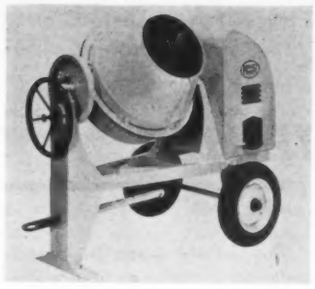
For more facts, circle No. 329→

New bearing features for concrete mixer

■ A Timken main spindle bearing and roller bearings for the countershaft represent the latest improvements in the Muller Machinery Co.'s 3½-cubic-foot tilting-type concrete mixer.

According to the manufacturer, the installation of mechanical bearings in this unit results in longer machine life, lower maintenance and replacement costs, and reduced power requirements.

The Muller 3½S—ideal for mixing mortar on the job—has a capacity of 5 to 6 cubic feet of loose material.



The Muller 3½-cubic-foot tilting concrete mixer is now equipped with Timken spindle bearings and counter-shaft rubber bearings.

For further information write to the Muller Machinery Co., Inc., P. O. Box 248, Metuchen, N. J., or use the Request Card at page 18. Circle No. 14.

Executive joins Presstite

Charles E. Cosby has joined the staff of Presstite Engineering Co., St. Louis, Mo., as executive assistant to the vice president in charge of sales. Mr. Cosby, will be responsible for marketing, merchandising, market analysis and research, and sales training and forecasting functions.

65,000 yds. of clay and sand per week

for 3 "C" Tournapulls

To speed relocation of 13 miles of State Highway 25 north of Howard, South Dakota, Pasco Construction Company, Sioux Falls, assigned 3 C Tournapulls 95% of all dirtmoving.

According to Owner Owen Pasco, the 3 "C's" moved a combined total of 65,000 pay yds. per 120-hour week on hauls averaging 800 to 1000 ft.

At this production rate, Pasco finished 500,000-yard job in 2 months.

Timed by field engineers on one 2400′ cycle, each of the 3 Tournapulls averaged a cycle every 3.75 minutes. Despite soft footing which made for tough going in borrow pit, load time varied from .75 to 1.0 minutes for 13 pay yards of sand and clay. Combined output for the 3 units was 40 loads (520 pay yards) per 50-minute hour.

1,500,000 yards per season

Says Pasco, "Our 'C's' did a very good job for us. We had no trouble to speak of. I don't think there is anything that can compare with our Le-Tourneau-Westinghouse equipment. In one season, our 3 Tournapulls moved 1,500,000 cubic yards."

Adds Mechanic Ralph E. Durfee, "Our 'Pulls are giving us very good service. They operate very easy, and I can make repairs and adjustments in short order as it is so easy to get at the different units."

For all-round performance under a wide variety of conditions, it will pay you to investigate Tournapulls. Why not have a demonstration on *your work?* Call us to arrange time and place. There's no obligation.

Loads weighed on the job

Time study production given in this report is based on a conservative estimate of 13 pay yards per load. Yet, men on the job report that weight tests made several times by engineers from a competitive manufacturer shows Tournapulls regularly scaled payload of 16½ yds.

Tournapull spreads load in 17 seconds. Jobs previously handled by the "C's" include 400,000-yd. 4-mile contract on Highway 77 near Del Rapids, and 465,000-yd. 13-mile highway contract at Desmet. When moving job-to-job, Tournapulls tow large shop trailers. Units made the 80 miles from Desmet to Del Rapids in 4 hrs.

Insure your future

For less than 25% of the cost of the original unit, you can get an 18-ton Rear-Dump hauler to interchange with the Tournapull Scraper. You save money because all you need buy is the rear-dump body... rear wheels, tires, and brakes may be interchanged.

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Peoria, Illinois

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AVOID LEGAL PITFALLS

Edited by A. L. H. STREET
Attorney-at-Law

These brief extracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Lessee not held for injury caused by defective unit

THE PROBLEM: *A lease of a crane to a contractor specified that the lessor should be indemnified by the contractor against all claims for injuries to persons or property, caused by the equipment while it is in the contractor's possession. Three of the contractor's employees were injured when a boom of the crane fell, due to negligence of the lessor in furnishing a defective and dangerous crane. Was the contractor bound to indemnify the lessor against damages awarded against the latter in favor of the injured men?*

THE ANSWER: No. (George M. Brewster & Son v. Catalytic Construction Co., 109 Atl. 2d 805, decided by the New Jersey Supreme Court.)

Liability of a state for faulty report

THE PROBLEM: *Bidders on a New York State sewer job were informed by the Department of Public Works: "Whenever subsurface borings or other subsurface information obtained by the department is available for a bidder's inspection, it is understood that it has been obtained with reasonable care and recorded in good faith with reasonable interpretations placed on the results and character of the materials and conditions to be expected. The bidder must interpret this information according to his own judgment and not rely upon it as accurately descriptive of subsurface conditions which may be found to exist. The information is made available to the bidder only in order that the bidder may have access to the identical information available to the department."*

The contractors encountered rock not shown by the state's test-boring report. Were they entitled to damages without proof that the state's officers and employees knew that the rock existed and made the report in bad faith?

THE ANSWER: No. (Rocell Construction Co. v. State of New York, 141 N. Y. Supp. 2d 463, decided by the New York Court of Claims.)

The court said that the mere existence of rock at a point where the report indicated there was none would not necessarily show bad faith but was an honest mistake. The court also noted that the boring report was not a part of the contract, but merely information furnished bidders on the conditions specified. On the other hand, it was stressed that the state as a contracting party is bound by the same rules of honesty and justice as govern individuals.

Contractor need not put flare on well-marked road

THE PROBLEM: *New highway construction was designed to shorten an old road kept open to travel while the new section, not open to travel, was being built. Was the contractor liable for injury to a motorist who, in the early morning, left the old highway at a point where the new road would join the old, on a theory that the contractor should have maintained flares or smudge pots at that point?*

THE ANSWER: No. (McClendon v. Boyd Construction Co., 80 So. 2d 32, decided by the Mississippi Supreme Court.)

The court said that abundant warning signs had been erected along the way and that the contractor was not bound to use flares or smudge pots until some part of the old highway should be closed to traffic or until some work was done upon it.

The decision is in line with one rendered by the Texas Court of Civil Appeals, Fort Worth, to the effect that a road contractor was not bound to maintain a flagman at an intersection on new construction that had not been opened to travel. (Driver v. Worth Construction Co., 277 S. W. 2d 940.)

Tax payment due after partnership is dissolved

THE PROBLEM: *A partnership with nominal capital derived its income from personal services in supervising housing construction. When nothing remained to be done but to receive what was due them for their services,*

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Light enough to mount on a 1½-ton truck, these boring machines need only 6' of platform space. Quickly adjusted to dig at any angle. Include an integral winch and pole derrick that will set 40- to 45-foot poles, weighing 2,000 to 2,500 pounds. Can be mounted on either truck or tractor.

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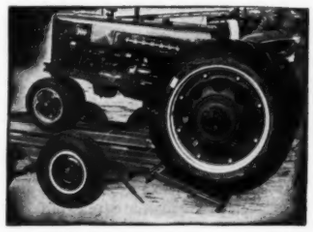

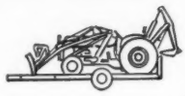

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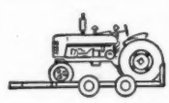

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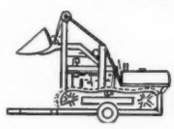

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one partner purported to sell his interest to a third party. Was the amount he received subject to taxation as personal income, rather than as capital gain, which would be more favorable to him?

THE ANSWER: Yes. (Trousdale v. Commissioner of Internal Revenue, 219 Fed. 2d 563, decided by the United States Court of Appeals, Ninth Circuit.)

The court approved a decision by the tax court that there was really a dissolution of the partnership under guise of a sale and that the sum the taxpayer had received constituted payment for personal services.

The court fully recognized the "right of a taxpayer to employ any legal method . . . he may select for the purpose of avoiding or minimizing taxes. But the means he employs must not be mere subterfuge or sham."

Ending of subcontract in line with agreement

THE PROBLEM: *A Florida contract to construct three buildings required that the contractor terminate a subcontract if the architect certified that its continuance would unreasonably delay progress. The contract also forbade alterations without written order. These provisions were embodied in a plumbing and heating subcontract. The subcontractor, however, substituted steel heat grids for the prescribed wrought iron ones, and used galvanized pipe instead of copper tubing. Furthermore, he failed to obtain necessary plumbing licenses. Did the architect rightfully order termination of the subcontract, and did the subcontractor forfeit right to pay for work done and the profits that he would have made had he carried out the subcontract?*

THE ANSWER: Yes. (May v. Arnold Construction Co., 78 So. 2d 705, decided by the Florida Supreme Court.)

Distinction drawn between architects and engineers

THE PROBLEM: *The Denver building code provides that only a state-licensed architect may prepare plans and specifications for "a building or structure of a public or semipublic nature or any other building or structure exceeding one story or 20 feet in height, excepting buildings hereinafter designated as industrial or heavily loaded buildings". In a separate provision by Colorado statutes for licensing engineers, "engineering" is defined as including consultation, planning, designing, supervising, etc., construction of "any public or private utilities, industrial buildings, structures, machines, equipment processes, works, or projects". Interpreted as preventing a licensed engineer from providing plans and specifications for a nursing home, was the code provision void?*

THE ANSWER: No. (Heron v. City of Denver, 283 Pac. 2d 647, decided by the Colorado Supreme Court.)

The court noted that the separate laws licensing architects and engineers were enacted the same day and worded as to make clear the intention that engineers are "confined to the industrial and structural field, while architects only are committed to the field of public or semipublic buildings".

In this case, an engineer's suit to compel the city building inspector to approve his plans and specifications was dismissed on the independent ground that, under the building code, the engineer's legal remedy to secure review of inspector's adverse ruling was an appeal to a special board provided for by the building code.

Road contractor not liable to motorist

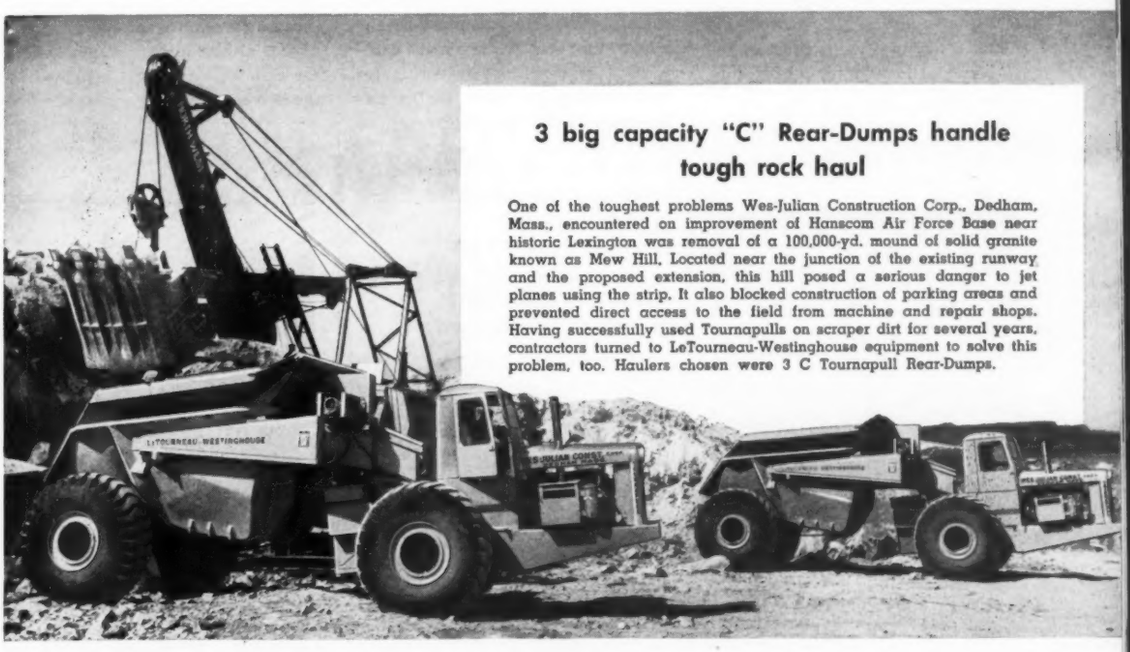
THE PROBLEM: *While resurfacing a road, a contractor placed warning signs at each end of the highway and at spots where actual construction was in progress. A truck slipped off the road on the way down a steep, freshly oiled surface. The driver had frequently traveled the road and knew it was under construction. The accident, which occurred in daylight, was due to driving 20 mph on freshly oiled surface and to manipulation of the truck gears. Was the contractor liable?*

THE ANSWER: No. (Robinson v. Bybee, 271 S. W. 2d 873, decided by the Kentucky Court of Appeals.)

Haulage contractor was not "employee"

THE PROBLEM: *A dump-truck owner contracted to haul asphalt on a road-construction job. He was to have been paid on a ton-mileage basis. A tire blew out while he was hauling a load*

(Continued on next page)



3 big capacity "C" Rear-Dumps handle tough rock haul

One of the toughest problems Wes-Julian Construction Corp., Dedham, Mass., encountered on improvement of Hanscom Air Force Base near historic Lexington was removal of a 100,000-yd. mound of solid granite known as Mew Hill. Located near the junction of the existing runway and the proposed extension, this hill posed a serious danger to jet planes using the strip. It also blocked construction of parking areas and prevented direct access to the field from machine and repair shops. Having successfully used Tournapulls on scraper dirt for several years, contractors turned to LeTourneau-Westinghouse equipment to solve this problem, too. Haulers chosen were 3 C Tournapull Rear-Dumps.

Solving a rock hill problem on $3,885,000 Air Base job

Rear-Dumps usually were loaded in 4 to 5 passes of 2½-yd. Northwest shovel. Each load averaged 18 tons. Because one "C" carried as much as could 3 to 4 average dump trucks, often used on jobs like this, Wes-Julian needed fewer haulers and fewer operators. All-steel body construction also reduced maintenance. Capacity of this Model "C" Rear-Dump, without sideboards, is 18 tons. Newest "C's" carry 22 tons.

Leaving the shovel, these Rear-Dumps accelerate quickly . . . go rapidly over both well-maintained haul road and soft fill. Runway is being extended 2300'. Pavement will be 200' wide with 200' shoulders on either side. Several 75' wide taxiways to be constructed include one 1000' long and another 1500' long. At the eastern end of the 150 acre air field job, Wes-Julian will also construct a 250' long blast pad.

Fill is dumped at end of runway extension. Note how body swings below and behind rear wheels. This keeps material from piling under unit . . . combined with front-wheel drive, allows safe dump over edge of fill or steep banks when necessary. When Mew Hill has been leveled, Rear-Dumps will haul another 100,000 yds. of rock, hardpan, peat, and clay from other borrow locations to grade for 6 miles of connecting highways.

Turning to dump in tight quarters of this ditch is no problem for C Tournapull Rear-Dump. Despite overall length of 29', "C's" can make non-stop 180° turn in space only 27' wide. In dump position, this remarkable unit requires only 21' for a non-stop U-turn. Steer works independently of footing through geared kingpin that connects trailing unit with prime-mover.

Tournapull—Trademark Reg. U.S. Pat. Off. R-746 H-b

For more information on Tournapull Rear-Dumps (or interchangeable scrapers and bottom-dumps) -lease write or call:

LeTourneau-Westinghouse Company

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of asphalt and he was injured in the ensuing accident. Was he entitled to an award against the construction company, under the Oklahoma Workmen's Compensation Law, on a theory that he was an "employee" of the company?

THE ANSWER: No. (Miller v. Steelman Construction Co., 282 Pac. 2d 740. decided by the Oklahoma Supreme Court.)

The court said that the claimant was not to be regarded as an employee merely because he was required to load the asphalt and unload it at places designated by the contractor, nor because he was required to protect his loads by tarpaulins, and directed not to drive too fast or too slowly on the highway under construction.

Abutter had no claim against road contractor

THE PROBLEM: *Flood conditions delayed construction of a highway through a Texas city, causing business loss to abutters. Did they have valid claims for damages against the city or the contractor?*

THE ANSWER: No. (R. B. Smith, Inc. v. W. E. Merritt & Sons, 277 S. W. 2d 801, decided by the Texas Court of Civil Appeals, Beaumont.)

The court said that damages suffered by adjoining property owners in the temporary obstruction of a street under construction are an "incident to city life and must be endured." The abutter recoups his damage in the benefit which he snares with the general public in the improvement being made. However, he has a valid claim for damages "if the city or contractor interferes with the highway without authority, or, if acting legally, prolongs the work unnecessarily or unreasonably."

Taxpayer has right to attack job award

THE PROBLEM: *Could one resident taxpayer of a city sue on behalf of all taxpayers to question the validity of an award of a contract to construct a city reservoir?*

THE ANSWER: Yes. (Niklaus v. Miller, 66 N. W. 2d 824, decided by the Nebraska Supreme Court.)

The decision follows a general rule of law that it is not essential that a resident taxpayer prove some special interest or injury before he can maintain a suit to enjoin an illegal expenditure of public funds. However, this suit was dismissed because the plaintiff failed to prove his claim that there had been an illegal award of the contract in question.

Breach of contract is joint liability

THE PROBLEM: *A pipeline-construction contract required the contractor to complete backfill, clean the site, and settle claims for right-of-way damages caused by the contractor. Were the contractor, its surety, and assignees jointly liable to the pipeline company for breach of those requirements?*

THE ANSWER: Yes. (Smith v. Pipeline Co., 128 Fed. Supp. 61, decided by the United States District Court, Northern District of Oklahoma.)

Subcontractor broke contract without cause

THE PROBLEM: *Was a subcontractor on a municipal job justified in refusing to continue work because the general contractor did not promptly pay the bills he had submitted for extra work? Delay in securing city approval of the bills and the subcontractor's delay in filing the performance bond required by his agreement caused the holdup.*

THE ANSWER: No. (Artukovich v. Simpson, 275 Pac. 2d 574, decided by the California District Court of Appeals, Second District.)

Valid vehicle taxation

THE PROBLEM: *Corporations not organized in Kansas used automobiles in their business in Missouri, where the vehicles were registered and taxed. But employees living in Kansas drove them into that state where they were stored overnight and on weekends. Were the cars taxable in Kansas, also?*

THE ANSWER: Yes. (V. S. Dicarlo Masonry Co., Inc., v. Higgins, 284 Pac. 2d 640, decided by the Kansas Supreme Court.)

The court recognized that transient vehicles are not taxable. However, because the employees operating the particular cars lived in Kansas where the cars were regularly benefited by the governmental protection afforded other vehicles, they could not be classified as "transient."

Pay is allowed under void sewer contract

THE PROBLEM: *The City of Charlotte, N. C. was empowered to contract for sewer construction, but the contract was not signed by the mayor as specifically required by the city's charter. The sewer system was completed and taken over by the city. Assuming that there was no enforceable contract and that the city was therefore not liable for the contract price, was it nevertheless liable for the reasonable value of the system?*

THE ANSWER: Yes. (Charlotte Lumber & Mfg. Co. v. City of Charlotte, 87 S. E. 2d 204.)

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The Neo-Flasher Barricade Unit can be rented for the operating cost of one kerosene torch or lantern.

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HIGH STRENGTH STEEL BOLTS and MIL-CARB* Carburized WASHERS
(*Trademark)

Used Exclusively on Steel Framing of New Caterpillar Tractor Plant

In the construction of the Caterpillar Tractor Company's new, modern plant at Decatur, Ill., (Caterpillar's sixth U. S. Plant) the Mississippi Valley Steel Co., of Decatur, specified High Strength Steel Bolts and MIL-CARB Washers exclusively for this important contract... supplied by GARY SCREW AND BOLT DIVISION, Pittsburgh Screw and Bolt Corporation, Gary, Ind.

This installation is typical of the rapidly growing recognition among structural engineers and contractors of the superior value of high strength bolted steel construction. More and more they are finding that hardened steel bolts, with properly hardened washers, can be torqued up to produce a greater clamping force than cooling of rivets . . . providing up to 25% higher fatigue resistance than comparable riveted joints . . . *plus* faster and more economical construction.

And because no bolt assembly is any better than its washers, high-strength bolting should include MIL-CARB Carburized Washers . . . fabricated from Prime Carburizing Quality Special Soundness Steel to insure uniform quality control, always equal to the rigid specifications for this type of construction.

Remember: "NO BOLT IS ANY BETTER THAN ITS WASHERS"

Distributed by Leading Bolt Manufacturers and U. S. STEEL SUPPLY DIVISION
UNITED STATES STEEL CORPORATION
208 South LaSalle Street
CHICAGO 4, ILLINOIS

FOR UNIFORMLY SOUND CONSTRUCTION specify MIL-CARB CARBURIZED WASHERS

MILWAUKEE WROT WASHERS
Since 1887

WROUGHT WASHER MFG. CO.
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The World's Largest Producer of Washers

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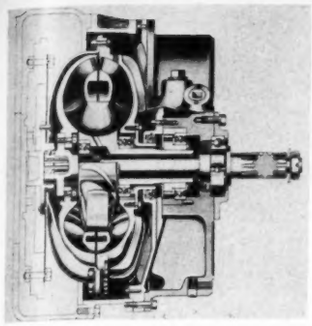
For more facts, use Reader-Reply Card opposite page 18 and circle No. 334



The Fuller Model 12-U-280 torque-converter coupling incorporates a 10-spline shaft on the output end for straight-line drives through a universal joint.

New torque-converter couplings for engines

■ Three new torque-converter couplings nominally rated at 280 foot-pounds of torque are now available for increasing the work capacity of heavy construction machinery, according to an announcement from the Fuller Mfg. Co.

Three simple elements—an impeller or pump, a runner, and a reaction member—compose these coupling units. The new models are the 12-H-280, which has a flanged output shaft for attachment of industrial-type couplings; the 12-T-280, which has an output shaft flanged for attachment of a single-plate clutch flywheel; and the 12-U-280, which incorporates a 1¼-inch 10-spline shaft on the output end for straight-line drives through a universal joint.

According to the manufacturer, advantages of the 2.1:1 torque multiplication and smooth fluid-coupling operation provided by the new torque-converter couplings are that faster work cycles are possible and less time and expense must be devoted to maintenance. The couplings are recommended for use in such machines as fork-lift trucks, winches, loaders, self-propelled cranes, truck cranes, and diesel and gasoline locomotives.

For further information write to the Fuller Mfg. Co., Kalamazoo, Mich., or use the Request Card at page 18. Circle No. 94.

Compacting screed finisher

■ The General compacting screed finisher, a new concrete-finishing machine said to produce more footage per day than any other similar unit on the market, is described and illustrated with on-the-job photographs in a booklet available from General Road Machines, Inc., N. Main St., Niles, Ohio.

Available in two models—the 5-S portable unit and the 4-S nonportable unit— this new finisher features giant double-braced screeds, measuring 16 inches wide, which are hydraulically raised and lowered. These and other features are detailed in the booklet.

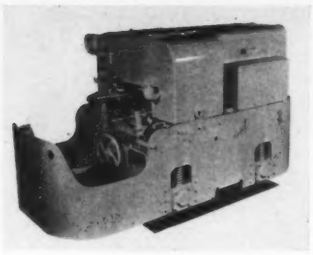
Detail photographs show components of the finisher and illustrate steps in its construction.

To obtain Bulletin 540 write to the company, or use the Request Card at page 18. Circle No. 11.

New 2-ton locomotive for material producers

■ A 2-ton diesel-powered unit capable of continuous drawbar pull up to 1,000 pounds has been added to the line of locomotives manufactured by Mancha Storage Battery Locomotive Division of Goodman Mfg. Co., 4850 S. Halsted St., Chicago 9, Ill.

Powered by a Hercules 2-cylinder 4-cycle engine rated at 30 horsepower, the new unit is equipped with an air-cooled hydraulic torque converter which, according to the manufacturer, doubles the engine torque under starting load and provides smooth operation without the use of a gear transmission. Speed is controlled by the engine throttle.



The new Mancha 2-ton diesel locomotive can exert a 1,000-pound continuous drawbar pull in a material producer's setup.

The new Mancha locomotive, which is recommended for use in material producers' setups, is suitable for either 18 or 24-inch gage tracks. It is 88 inches long, 39 inches wide, and 47 inches high.

For further information write to the company, or use the Request Card that is bound in at page 18. Circle No. 22.

On their 14 mile section of the Garden State Parkway in Cape May County, New Jersey, Public Constructors, Inc., Pleasantville, are using a 19 mph rubber-tired Tournatractor for all-around utility work.

This 208 hp tractor works all over their widely-scattered 2¼ million-yard sand job. It often moves ahead of the company's 33 scrapers to clear trees and brush and handle pioneer dozing. At times, it is used to level cuts and fills and to doze around bridges and culverts. Because of its speed and maneuverability, tractor-on-rubber performs these utility assignments without interfering with production dirtmoving.

Besides leveling work, Tournatractor is also used to push-load some of the contractors' 11 C Tournapulls. Where material is pure white sand, tractor's fast pusher-service loads the 16-yd. "C's" in as little as 45 seconds.

Used for other scattered jobs

Tournatractor is always ready for emergency calls, too. Jobs 5 miles away can be reached in 20 minutes (or less) due to its 19 mph speed. Cleaning haul roads and dozing fill on distant sections of the job are handled quickly and efficiently. Paved highways present no travel problems for the tractor-on-rubber. It goes everywhere under its own power . . . needs no blocking, planking, trailer-loading and unloading. For all around utility service, it "gives a great performance day after day," says Supt. John Franks.

Discover for yourself why the fast, mobile Tournatractor is ideal for utility-type assignments, as well as major tractor work. Phone or write for a demonstration on your job, today. There's no obligation.

Tournatractor, Tournapull—Trademark Reg. U.S. Pat. Off. T-837-H-b

Tournatractor, with its 4-wheel drive, push-loads 16-yard C Tournapull in 45 to 60 seconds. Big low-pressure tires provide plenty of traction and flotation even in this poor, sandy footing.

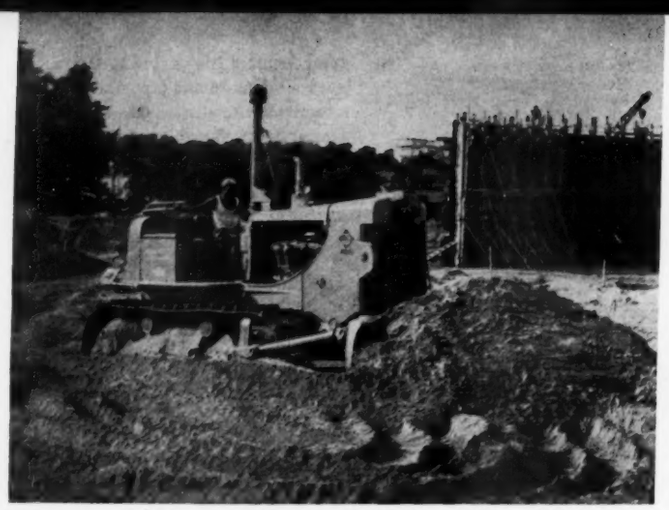
LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

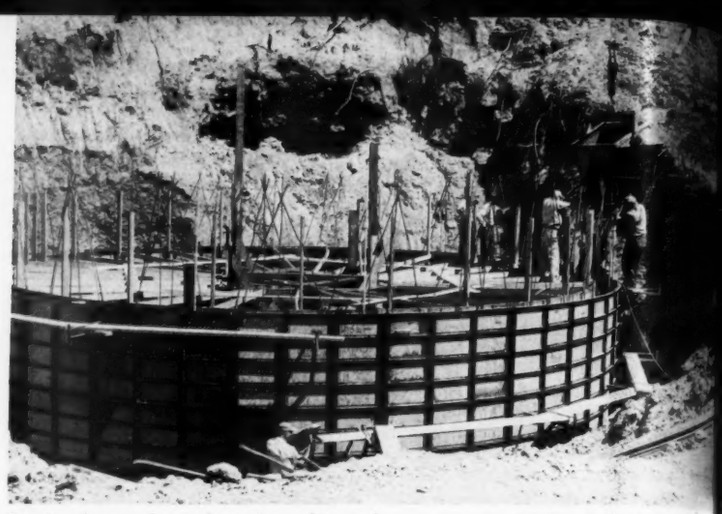
A Subsidiary of Westinghouse Air Brake Company

For more facts, use Reader-Reply Card opposite page 18 and circle No. 335

CONSTRUCTION CAMERA



Part of the 150,000 yard earthmoving job for the 1,950-foot bridge between Abidjan and Treichville, in French West Africa, is handled by Allis-Chalmers equipment like this HD-16 torque-converter-drive tractor. The span will have a dual lane roadway, and a railroad under the main deck.



Forming for circular tanks such as this at the new sewage treatment plant at Oglesby, Ill., is put up quickly with Uni-Form panels. Tanks and other structures totaling 23,000 square feet of contact area, were built by Valley Builders, Inc., Spring Valley, Ill., using 4,000 square feet of forms.

DRILLING

to Investigate Underground Conditions

the MOBILE* *way!*

There is a versatile, one-man Mobile Drill costing as little as $1,290. Available with hydraulic or hand feed.

. . . a few of the users of MOBILE DRILLS:

- *Arkansas Resources & Development Commission
- *Board of County Road Commissioners (Grand Rapids)
- *Delaware Geological Survey
- *S. J. Groves Constructions
- *Peter Kieweit and Sons
- *Moss-Thornton Company, Inc.
- *Western Contracting Co.
- *Williston Shell Rock Co.
- *80% of State Highway Departments.

There's nothing like a Mobile Drill—for low original cost—for versatility—and for maneuverability. Mounted on a Jeep or a 4-wheel-drive truck, the rugged, lightweight Mobile Drill can be transported over roughest terrain.

It's better to be safe—rather than sorry when making a bid. It costs so little with a Mobile Drill. Be sure—get your sub-soil information the Mobile Drill way! Write for full information—no cost or obligation.

* *World's Largest Manufacturer of Light Vehicle Powered Drills*

MOBILE DRILL

MOBILE DRILLING, INC.
950 NORTH PENNSYLVANIA STREET
INDIANAPOLIS 4, INDIANA

For more facts, use Reader-Reply Card opposite page 18 and circle No. 336

Road and traffic effect on car operation studied

The operation of an automobile under various traffic conditions and over different types of roads is reported in publication 358, a new booklet issued by the Highway Research Board, 2101 Constitution Ave., Washington, D. C.

"Vehicle Operation as Affected by Traffic Control and Highway Type" contains three papers, the first of which reports on such items as speed, deceleration, percentage of maximum intake manifold vacuum, fuel consumption, and other characteristics of a 1951-model car operated on 28,000 miles of highway during 1951 and 1952. Included are reports on studies of auto operation on freeways, major highways, and studies relating to traffic signals, sight distance, grade separations, and other traffic conditions.

The second paper is concerned with changes made in traffic control on Reading Road, Cincinnati, and a study of the effects of these changes. The last paper reports on twelve case studies of car operation on two road sections, one having limited access and one having nonlimited access. The booklet costs 90 cents and may be had by writing the Highway Research Board.

Crow Construction Co. marks 115th year

To commemorate its 115th anniversary, the William L. Crow Construction Co., New York, N. Y., has issued a 28-page brochure showing some of the buildings it has erected in the United States and abroad in recent years. Photos show the exterior and interior of banks, hospitals, hangars, university buildings, and department stores in this country.

Work the company had done for the government in foreign countries is also pictured. A running commentary accompanies the photographs.

ANNOUNCING . . . *The most revolutionary achievement in ARC WELDING equipment in years!*

Dimensions: only 11" x 12" x 7½"

BREN-WELD MODEL 200 AW

Weighs only 65 lbs.— Carry it to the job!

Patent Pending

FIRST TRULY PORTABLE 200 AMP. OUTPUT ARC WELDER

OBSOLETES ALL OTHER WELDERS OF COMPARABLE RATING

List Price $169.50 F. O. B. Long Island City, N. Y.

Sensational new transformer development produces far more power to pound! The BREN/WELD does work of conventional welders 4 or 5 times its size and weight . . . Actually delivers up to 250 amps at reduced duty cycle.

Simple to use, fully guaranteed, it operates on 110/220 volts AC, 50/60 cycles; handles electrodes from 3/64" to 5/32". Has adjustable arc voltage for different arc characteristics. Ideal for plant production and maintenance, for construction work, railroads, on the farm or home.

See your dealer or write direct for details of free trial offer!

24 hour delivery from stock!

KASSON

Manufactured by BRENNEN, BUCCI & WEBER, INC. New York City

SALES DIVISION
KASSON DIE & MOTOR CORPORATION
Integrity Since 1919
32-14 NORTHERN BOULEVARD, LONG ISLAND CITY 1, N. Y.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 337

A new road next to a dam has shoulders sloped by a Lorain 22½-ton MC-424 Moto-Crane with a dragline bucket. This work near the spillway of the newly completed Dexter Dam, Dexter, Oreg., is being done by Hall Heavy Hauling Co., Eugene, Oreg.

One of the important jobs at the Witte Sand & Gravel Co. pit near Kinder, La., is that of stripping overburden from the deposit. The Lake Charles, La., firm uses a Euclid twin-power 18-yard scraper to pick up a heaping load of silty clay for hauling to the disposal site.

Text discusses nuclear reactor engineering

A new text written for the practicing engineer and for the engineering student interested in nuclear energy has been published by D. Van Nostrand Co., Inc. Entitled "Principles of Nuclear Reactor Engineering", the book describes the fundamental scientific principles upon which reactor engineering is based.

Written by Samuel Glasstone, a consultant of the United States Atomic Energy Commission, the 861-page book is generously illustrated with graphs and diagrams of nuclear processes. Formulas and equations accompany discussions of each theory. The book covers a wide range of topics including the design, construction, and operation of reactors for the release of energy by the fission of atomic nuclei. A 17-page index pinpoints each item mentioned in the text.

With foreword written by Lewis L. Strauss, chairman of the Atomic Energy Commission, "Principles of Nuclear Reactor Engineering" is available from the publisher, D. Van Nostrand Co., Inc., 250 Fourth Ave., New York 3, N. Y., and is priced at $7.95.

Universal Atlas appoints

John T. Hughes has become assistant sales manager of the New York sales territory of Universal Atlas Cement Co., New York, N. Y., a subsidiary of U. S. Steel Corp.

Hughes joined the firm's Boston sales office in 1946 as a salesman, after four years' service in the navy.

BUILD With the BEST
DESLAURIERS
ROUND COLUMN FORMS
Sturdy • Straight • True
Since 1888—the standard in the construction industry...for lease only or, for lease-and-erection. Diameters; 12" to 56" and larger; any height. Two attractive capitals.
Write Today for FREE Folder or quotation
DesLauriers Column Mould Co., Inc.
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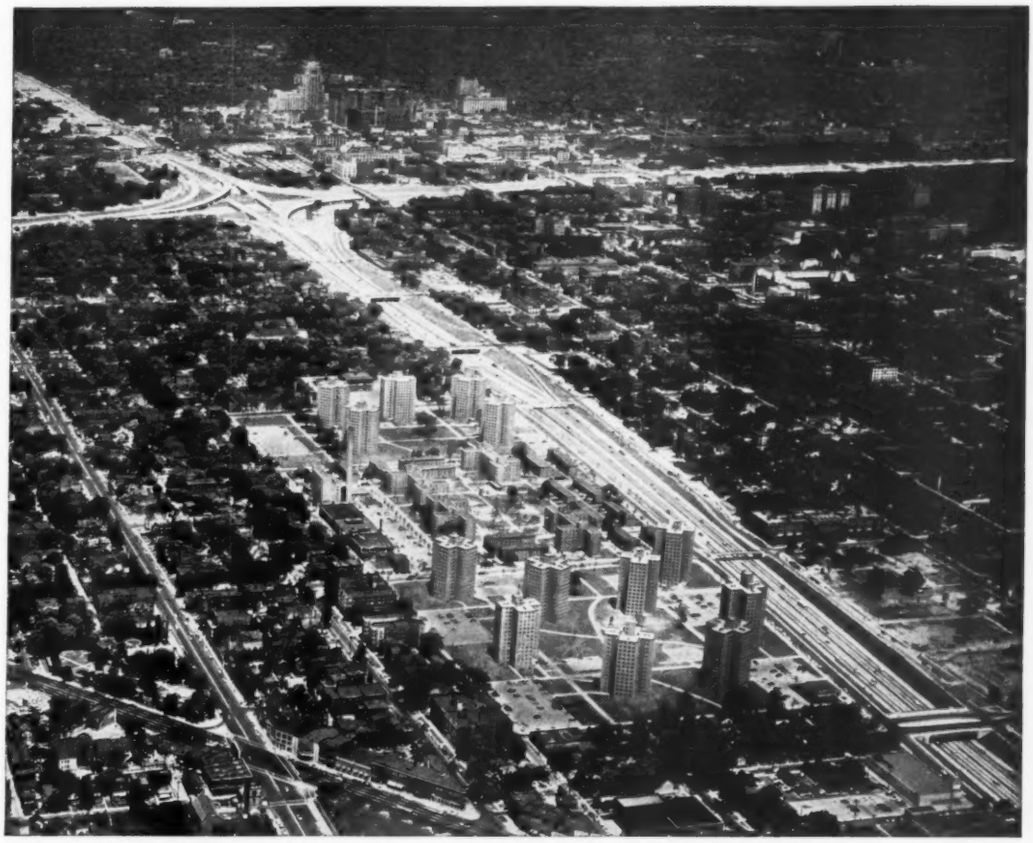


Two New Expressways to Untie Traffic Congestion in Detroit

Completion of two new expressways criss-crossing downtown Detroit will relieve the urgent traffic congestion problem in that city's metropolitan area. In addition, the expressways will greatly reduce time and inconvenience in traveling to and from the suburbs.

The John C. Lodge Expressway will run north from Jefferson Avenue for a distance of nine miles. The Edsel Ford Expressway will extend fourteen miles from the western to the eastern city limits.

Both expressways are designed to carry all types of traffic, with a capacity of 9000 vehicles per hour. Cross traffic is carried on overhead bridges, and there will be no traffic lights or grade intersections. The new highways have a minimum of three 12-ft traffic lanes in each direction, a 14-ft medial strip, two 8-ft refuge lanes, and two 30-ft service drives where necessary. Interchange ramps are placed at approximately ¼-mile intervals.

Bethlehem supplied steel for various already completed sections of the Ford-Lodge Expressways, and is in addition supplying steel for other portions now under construction. Among the Bethlehem steel highway products being used in the expressways are dowel units, reinforcing steel, and structural steel for bridges and overpasses.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

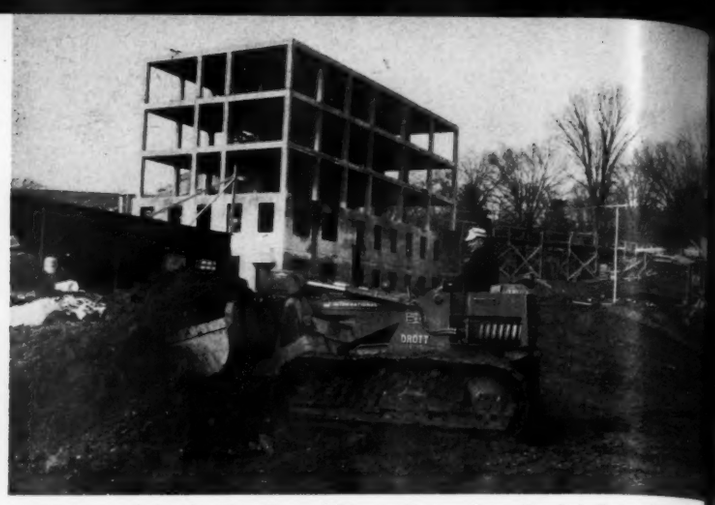
BETHLEHEM STEEL

BETHLEHEM STEEL

For more facts, use Reader-Reply Card opposite page 18 and circle No. 339

CONSTRUCTION CAMERA

Tracks and ties are removed so a Marion 13½ yard 560-ton walking dragline can be moved 7 miles in 7 days in Indiana. Power for the trip was supplied by a Caterpillar mobile electric set at a cost of $30,000. Disassembling would have cost about $60,000. At the job site the rig gets power from a utility line.



Excavation work for the $1 million addition to Eastern State Hospital, Knoxville, Tenn., is done by Johnson & Galyon Construction Co., Knoxville, with an International TD-9 Skid-Shovel. The new addition has 60 wards, plus facilities such as day rooms, swimming pool, offices, kitchen, and dining room.

Over 30%

Cost Reduction

in Time and Labor

PERMITE CONCRETE CURING COMPOUNDS

It's a proven fact:

Paving contractors have found that they can *save as much as 37%* in time and labor by using Permite Concrete Curing Compounds rather than the usual curing methods . . . enabling them to make lower bids, offer superior jobs, make better profits.

Permite's effective sealing retains 95% or more of the original mixing water well beyond the critical curing period. One gallon cures 200 sq. ft. of horizontal surface. No drum deposit; no drum return.

Permite Concrete Curing Compound PW-40 (White) offers the unique advantage of being packaged in 55-gallon agitator-type drums for complete and uniform agitation before and during application.

MEET ALL SPECIFICATIONS

Permite Concrete Curing Compounds — both white and clear — meet the specifications of the Corps of Engineers, U. S. Army; the Department of the Navy, NAVDOCKS; other federal agencies and most states, counties and cities.

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ALUMINUM INDUSTRIES, INC.
CINCINNATI 11, OHIO
Curing Compound Division
Curing Compounds and Air Entraining Agents

For more facts, circle No. 340

Comprehensive handbook on engineering materials

The newest volume in the Wiley engineering handbook series is the "Handbook of Engineering Materials", which has been designed as a guide in the selection of materials for particular jobs. More complete than a technical dictionary and less exhaustive than a specialized textbook, the handbook provides a single source of information on the usual materials of construction and suggests sources of more complete information after a treatment of each subject.

Emphasis in the book is placed on quantitative information, and a minimum of descriptive text is used. Historical background and the method of manufacture of each material have generally been omitted since they are not of prime interest to the user. Prepared by a staff of 51 specialists and edited by Douglas F. Miner and John B. Seastone, the book assumes the user to have a basic knowledge and vocabulary covering units of measurement, methods of calculation, and type of graphic representation.

The material is arranged by classes of related or similar materials, so that a user may make a quick comparison of the qualities of materials that are competitive. The book is divided into four sections, dealing with general information on materials, metals, nonmetals, and construction materials.

Section 1 deals with general information on materials, including specifications for procurement, materials tests, process finish, and safety, together with standardizing agencies, decimal size designations, stock sizes,

(Concluded on next page)

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when PROTECTIVE MAINTENANCE is due

HOBBS ENGINE HOUR METERS make it easy to plan a definite program of protective maintenance on your powered equipment. ON-TIME maintenance means longer equipment life . . . less down-time . . . fewer repairs — a more profitable operation in the long run.

ACCURATE—*Not a Revolution Counter*

The HOBBS HOUR METER records ACTUAL RUNNING TIME on all types of powered equipment — stationary or mobile — gasoline or Diesel. This electric timing instrument tells you the HOURS and MINUTES of engine operation — important accuracy no revolution counter can provide.

APPROVED BY LEADING MANUFACTURERS

Installed as original equipment or recommended as an approved accessory by leading construction equipment manufacturers. Ruggedly built — easy to install. See your factory branch, representative or distributor . . . or WRITE:

HOBBS *Engine Hour* METERS

New and Improved Through Continuing Engineering Research

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2067 YALE BLVD. SPRINGFIELD, ILLINOIS
World's Largest Builders of Running Time Meters

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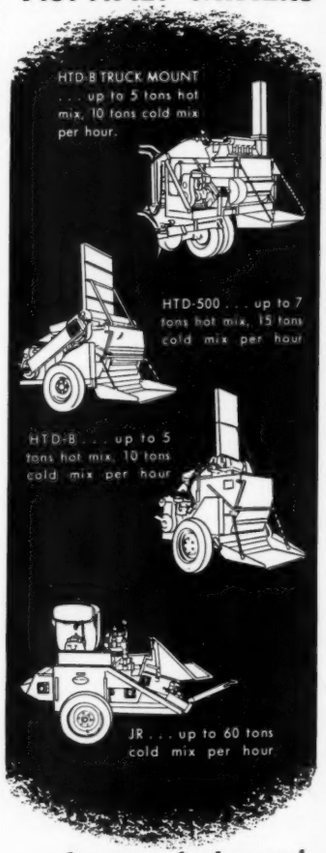
***McConnaughay* ASPHALT MIXERS**


HTD-B TRUCK MOUNT . . . up to 5 tons hot mix, 10 tons cold mix per hour.
HTD-500 . . . up to 7 tons hot mix, 15 tons cold mix per hour
HTD-B . . . up to 5 tons hot mix, 10 tons cold mix per hour
JR . . . up to 60 tons cold mix per hour

. . . for resurfacing and patching in any season

Designed for economy of operation and fast production, the McConnaughay line of Asphalt Mixers meets every need for most resurfacing as well as all types of pavement patching. Working on location, McConnaughay HTD Mixers provide the *exact amounts* of materials needed and effectively remove both moisture and solvents from bituminous mixtures . . . positive assurance that patches and resurfaced areas will set up hard. For details and specifications on the mixers above and on the JR and HTD-LP models (not illustrated), write, wire or 'phone . . .

ASPHALT EQUIPMENT CO., INC.
3929 Buell Drive, Fort Wayne, Indiana
National distributors for
K. E. McConnaughay, Lafayette, Ind.

For more facts, circle No. 342

Forms for an overpass leading to the San Francisco Bay bridge are set by a Bucyrus-Erie 22-B truck crane with 60-foot boom. Part of the Richmond-Orinda cutoff, this project is being built for the California Highway Commission by Fredrickson & Watson Construction Co., Oakland, Calif.

Aeration of borrow-pit material for Table Rock Dam is provided by a Towner disk, pulled by a Caterpillar diesel D8 tractor equipped with a No. 8S bulldozer. Morrison-Knudsen Construction Co., Boise, Idaho, is the contractor on the project, which is being constructed on the White River near Branson, Mo.

(Continued from preceding page)
and approval of stocks. Statistics in the application of materials and mathematical and physical tables are also included in this section.

Materials made from ferrous metals, aluminum, magnesium, copper and its alloys, zinc, nickel and its alloys, and other pure materials are dealt with in section 2. The properties of these metal materials, their strengths, applications, workability, availability, and other considerations are covered.

Nonmetals, such as wood and wood-base material, paper, fibers, plastics and rubbers, organic finishing materials, fuels, carbon products, ceramic materials, industrial chemicals, and lubricants are discussed in section 3.

The last section covers construction materials. Gypsum, lime, and portland cement are covered in cementing materials, and ingredients of concrete, the theory of proportioning, mixing, transporting, placing, and finishing and curing concrete are included in a subsection. This section also covers roadbed materials for various types of roadbeds, bases, and surfaces. Timber and rope materials and their characteristics are discussed. The subsection on foundations treats subsurface materials and the definition, classification, and identification of soils. Weather-resistant materials for roofs and walls, and protective coatings are considered under a subhead concerned with weather and moisture protection. Various types of glass products, including plate, laminated safety, glass block, PC Foamglass, conclude the section.

Graphs and tables most useful to engineers are included in the text of the more than 1,000-page volume. Copies of the handbook are priced at $17.50 and may be ordered from the publisher, John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y.

Wood siding is still the leading exterior finish for American homes, reports the National Lumber Manufacturers Association. It is low in cost from the standpoint of material and installation and can withstand all extremes in climate.

COMPARE ABILITY...COMPARE COST! CHOOSE THE BD-3 MOTOR GRADER

Outstanding Performance On All Types of Jobs The Allis-Chalmers BD-3 is a *quality* motor grader — with such features as tandem drive for maximum traction; exclusive ROLL-AWAY moldboard that efficiently rolls the load instead of pushing it; high axle and throat clearance to clear large windrows; husky tubular steel frame that absorbs stresses and strains. In addition, the BD-3 has the right combination of weight, power and traction to do outstanding work on a wide variety of motor grader jobs.

Economical to Own and Operate. The BD-3's economy begins with its purchase price. You are invited to compare this with the cost of other graders in its class. Compare also what you get for your money. The modern engineering, quality materials and precision workmanship in the BD-3 are your assurance of long-life dependability.

ROLL-AWAY is an Allis-Chalmers trademark

CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

78 brake hp — 19,220 lb
6 forward speeds to 18.5 mph
3 reverse speeds to 6.3 mph

ALLIS-CHALMERS

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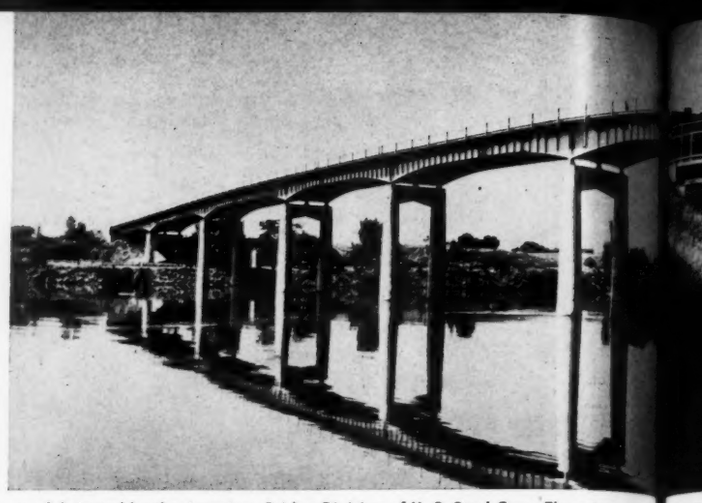


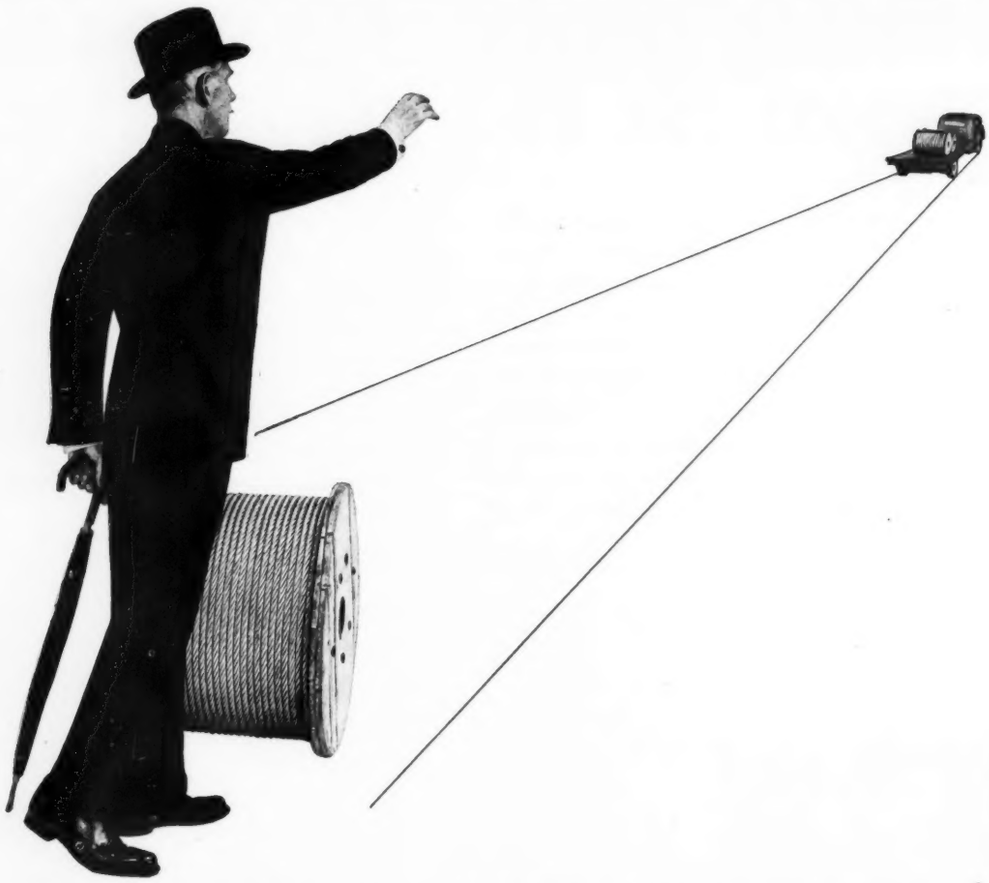
These four bridges are among nine selected as the most beautiful steel spans opened to traffic in 1954 in the 27th annual aesthetic bridge competition sponsored by the American Institute of Steel Construction. Above, the winner in Class I, bridges with spans of 400 feet or more, is the Missouri River Bridge, Paseo, Kansas City, Mo., which was fabricated by the American Bridge Division of U. S. Steel Corp. The winner in Class II, bridges with spans under 400 feet and costing more than $500,000, is the Little Chute Bridge over Fox River in Outagamie County, Wis., above. This was fabricated by Bethlehem Steel Co. The Garrison School Pedestrian

AISC selects winning brid 27th

Nine bridges were selected as the most beautiful steel spans to be erected in the country in 1954, in the 27th annual Aesthetic Bridge Competition sponsored by the American Institute of Steel Construction. Stainless steel plaques will be awarded to the three top winners, and honorable mention certificates will be given to the remaining six.

Awards were made to bridges in each of three classes, but no award was given for Class IV, movable bridges.

The winner of the Class I group, for bridges with spans of 400 feet or more, was the Missouri River Bridge, Paseo, Kansas City, Mo. Owned by Jackson and Clay counties in Missouri, the bridge was designed by Howard, Needles, Tammen & Bergendoff, New York, N. Y., and fabricated by the American Bridge Division of United States Steel Corp. The span was selected because "it offers an



YOUR WICKWIRE ROPE DISTRIBUTOR SAVES YOU DOWN TIME

When the lack of the proper wire rope halts your production or your operations, thank your lucky stars that your helpful Wickwire distributor is only a quick phone call away. It's a wonderful feeling . . . to know you'll be getting exactly what you need from his warehouse stocks in only a few hours time.

Now contrast that with the cost in time, money and inconvenience of emergency shipments direct from a distant manufacturer.

In addition to saving on down time, your Wickwire distributor effects further economies by recommending the wire rope that will give you the longest service life, by minimizing your bookkeeping, inventory maintenance and transportation costs. He keeps your reserve stocks for you so that you don't tie up capital in stand-by materials, warehouse space and unnecessary stock insurance and handling.

Your Wickwire Rope distributor is a good man to know. He's quality people handling quality products. Buy your wire rope and slings from him. You'll find that the many valuable services he offers far outweigh any apparent price advantage you might gain by buying direct.

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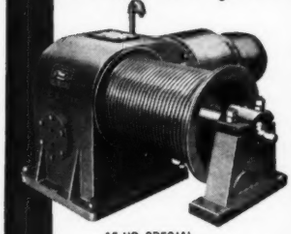
BUILT TO YOUR needs from standard parts



15-HP SPECIAL PURPOSE HOIST
single fixed drum, worm gear drive

Meet your hoisting needs *precisely* at lowest possible cost. Call on our long experience in modifying and re-combining standard parts to meet specialized hoisting requirements.

Write for bulletins and catalogs

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Main Office and Works:
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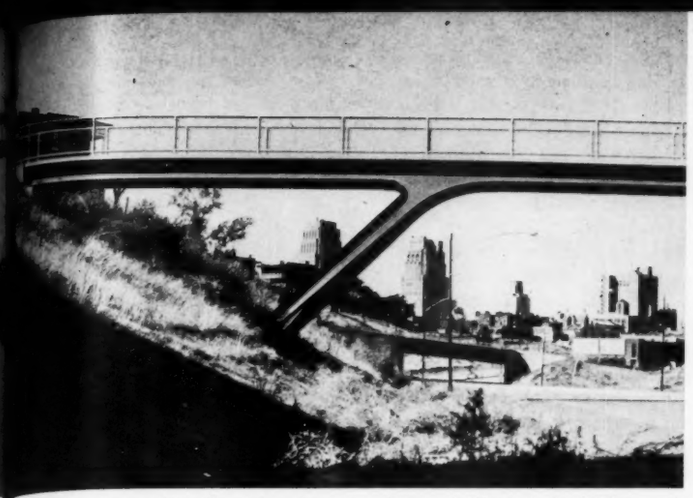
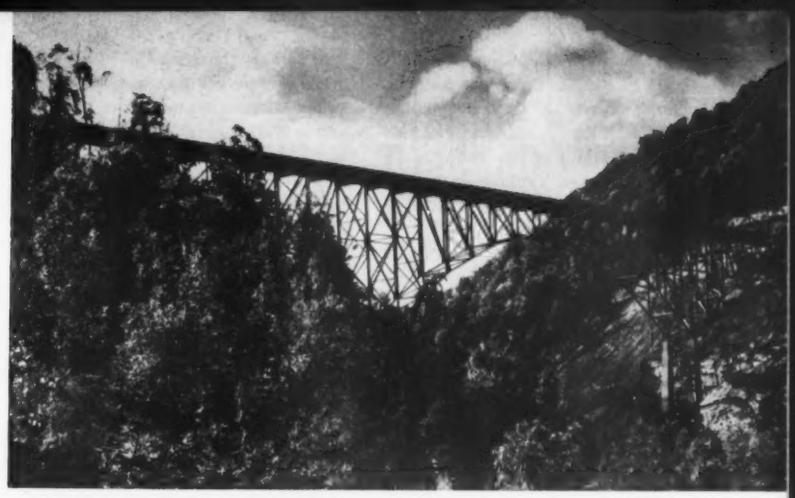
For more facts, circle No. 345





Bridge, Kansas City, Mo., (above) won top honors in Class III, for bridges with fixed spans under 400 feet and costing less than $500,000. Fabrication was done by Kansas City Structural Steel Co. This year, there was no award made for Class IV, for movable bridges. Stainless steel plaques will be awarded to the three winning bridges. Honorable mention certificates will go to six bridges, one of which is shown above. This, in the Class I category, is the Stanley Bender Bridge at Four Mile Fork on the West Virginia Turnpike. This bridge was also fabricated by American Steel Division, U. S. Steel Corp.

27th annual competition

unusual contrast to the more familiar form of suspension bridge and represents a pleasantly economical use of material for the work to be done. The breadth of the roadway is mirrored in the proportions of the rigid frame towers which afford clean flowing lines for the roadways."

Little Chute Bridge over Fox River in Outagamie County, Wis., won in the Class II competition for bridges with spans under 400 feet but costing over $500,000. It was designed for the state by the bridge section of the State Highway Commission of Wisconsin and was fabricated by Bethlehem Steel Co. The bridge was selected for the unusual harmony between its superstructure and supports and for the handling of its components.

In the Class III division for bridges with fixed spans under 400 feet and costing less than $500,000, the Garrison School Pedestrian Bridge over a

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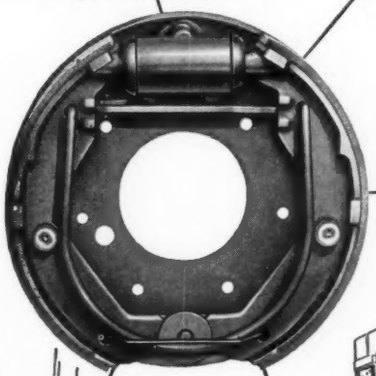
IF IT MOVES
WE CAN STOP IT!



TDA BRAKES

...for every industrial or automotive application where braking is required!

FSH...Floating Shoe Hydraulic Brake
Designed for close control with heavy loads

The FSH Brake presents some remarkable new advantages to manufacturers who need a better, longer lasting Hydraulic Brake. The features of the FSH were developed after years of field work and laboratory study. These advantages can be a road to new economy and better control for *your* equipment.

FSH Brake shoes operate with a floating action. This eliminates the danger of liner loads concentrating at one point . . . permits the shoe to follow the drum. The result of this even load distribution is a highly dependable, controllable brake—*in either direction* of travel. This is especially important when stacking heavy loads at high levels and maneuvering at close quarters.

For Additional Information . . . contact the Timken Brake Division. Complete details on the FSH Brake are available. And, a staff of experienced engineers can assist you with any brake problem you encounter.

Mechanical Parking Brake Hook-up
A separate parking brake is no longer necessary with FSH. If specified, the FSH Brake can be furnished with a mechanical parking brake linkage that functions independently of the hydraulic system.

Long Life Lining
Brake lining is bonded to the shoe to give maximum lining area with no lining waste.

Positive Automatic Adjustment
One application of the foot pedal sets the automatic adjustment. No further adjustment of the brake is required during the full life of the brake lining.

Positive Contact Drum Seal
For applications where a sealed brake is required, the FSH is designed to incorporate a seal between the brake backing plate and brake drum.

TIMKEN Detroit BRAKES
TIMKEN-DETROIT BRAKE DIVISION
ROCKWELL SPRING AND AXLE COMPANY
ASHTABULA, OHIO
Accepted TDA Standard
TRADE MARK REGISTERED

For more facts, use Reader-Reply Card opposite page 18 and circle No. 347

connection between Paseo and Sixth Street in Kansas City, Mo., was the winner. Chosen for the economic use of material, the bridge was designed for Clay and Jackson counties by Howard, Needles, Tammen & Bergendoff and was fabricated by Kansas City Structural Steel Co.

Honorable mention in the Class I competition was awarded to the Stanley Bender Bridge, Four Mile Fork, West Virginia Turnpike, Standard, W. Va., and to the Cornelius H. Charlton Bridge at Camp Creek on the West Virginia Turnpike. Both were designed for the West Virginia Turnpike Commission by Howard, Needles, Tammen & Bergendoff and fabricated by the American Bridge Division of United States Steel Corp.

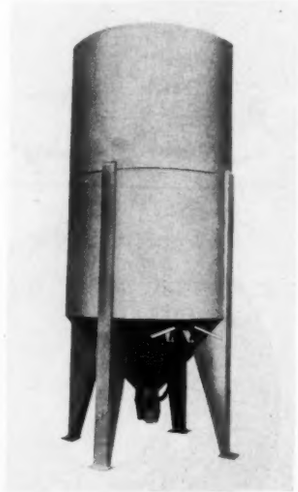
Honorable mention as Class II bridges went to the Raritan River Bridge, Garden State Parkway, N. J., and to Walkill River Bridge, Rosedale, Ulster County, N. Y. Owned by the New Jersey Highway Authority, the Raritan River Bridge was designed by D. B. Steinman and fabricated by Bethlehem Steel Co. The Walkill River Bridge was designed by the State of New York, Department of Public Works, assisted by Edwards, Kelsey & Beck, and was fabricated by the Phoenix Bridge Co.

Indian Creek Bridge, Plumas County, Calif., owned by the state and designed by the bridge department of the Division of Highways, State of California, won honorable mention in Class III. It was fabricated by Moore Drydock Co. Also receiving honorable mention in this class was the Cowhide Branch Bridge, Annapolis Bypass, Md., which is owned by the Maryland State Roads Commission. J. E. Greiner Co., Baltimore, was the designer, and Bethlehem Steel Co. the fabricator.

A five-man jury chose the winners. Judges were: George B. Cummings, president of the American Institute of Architects, Binghamton, N. Y.; Igor B. Polevitsky, architect, Miami, Fla.; Daniel C. Rich, director of the Art Institute of Chicago, Chicago, Ill.; John B. Wilbur, head of the department of civil and sanitary engineering, Massachusetts Institute of Technology, Cambridge, Mass.; and William W. Wuster, dean of the College of Architecture of the University of California, Berkeley, Calif. Dean Wuster served as chairman of the jury. THE END

Bulk storage unit has swing control gate

■ An all-steel bulk storage unit for cement and other free-flowing materials is being marketed by Andrews Machine Co., 359 E. Main, Decatur, Ill. Available in 10 or 25-ton capacities, the bin is fabricated in one unit



on four legs, eliminating any assembly on delivery.

The storage unit has a hopper bottom with a swing control gate for more effective discharge control. The bin is made of 12-gage steel, with 16-gage steel used for the top. An 18-inch manhole and cover for loading is located on the top.

For further information write to the company, or use the Request Card at page 18. Circle No. 185.

Rubber coupling joints

■ A booklet describing Tylox rubber joints for coupling pipe used in sewerage and drainage projects is available from the Hamilton Kent Mfg. Co., 427 W. Grant St., Kent, Ohio.

The brochure gives the history of the development of flexible rubber gaskets, and complete data on Tylox joints. Other information includes illustrated case histories of Tylox-jointed installations, and suggested rubber joint specifications for tongue-and-groove concrete pipe; bell-and-spigot concrete pipe; and bell-and spigot vitrified clay pipe.

To obtain this literature write to the company, or use the Request Card that is bound in at page 18. Circle No. 99.

CEMCO
POWER TAKE-OFF
Joins the search for
URANIUM

Typical of a CEMCO application, the Longyear core drill shown here gets power from the truck motor via CEMCO and a Jaeger compressor.

If a separate motor were required for the compressor there would not be sufficient room on the truck.

CEMCO Power Take-offs find wide application where it is either economical or otherwise advisable to utilize the power of the truck motor.

Let us help you with your truck-mounted power problem. Write for information—describing your needs.

CEMCO INDUSTRIES, INC.
GALION, OHIO

Little Star Uranium Company, Casper, Wyoming, powers its core drill from truck motor.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 348

BROWN & ROOT, ENGINEERS:
"SOLVED OUR PROBLEM"
WITH THE EXACT PILING THE JOB NEEDED

FOSTER RENTAL PILING SERVICE

Delivered the exact lengths of MP116 piling needed to prevent any danger of losing a dam through river floods or cave-ins on this cofferdam job. An efficient delivery assured contractors Brown & Root an uninterrupted work schedule.

Cofferdam construction for AUSTIN, TEXAS POWER HOUSE on Banks of Colorado River. Steel-sheet piling, supplied by L. B. Foster Co., was used in 35 to 40 ft. lengths to make up the cofferdam which will be filled with 120,000 cu. ft. of concrete.

"FASTER from FOSTER"

Get complete piling service from Foster —

the right type, the exact section, the exact length . . . and when you need it . . . on low, fixed expense of our RENTAL Plan.

STEEL-SHEET PILING
H-BEARING PILE • PIPE PILES
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Write for Catalog C-11
RAILS • TRACK EQUIPMENT • PIPE FABRICATION
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PITTSBURGH 30 • NEW YORK 7 • CHICAGO 4
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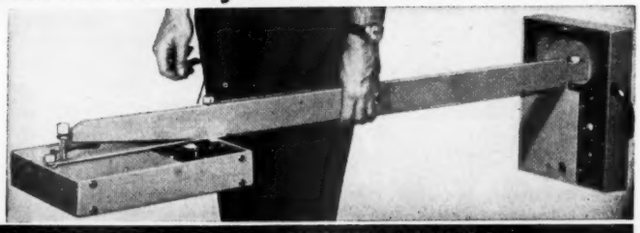
For more facts, circle No. 350

Weather Conditions Do Not Affect The Efficiency Of WILKINSON LINE LOCATORS!

WILKINSON LINE LOCATORS Penetrate Snow, Ice, Concrete, Cement, or ANY Obstruction . . .

1. *NOW* . . . the Automation Method of Manufacture Insures Dependability and Greater Uniformity of Function.
2. Spots all pipe and cable locations before uncovering, preventing damage, expensive repairs and lost time.
3. Indicates depth too.



WILKINSON PRODUCTS COMPANY
3987 Chevy Chase Drive — Pasadena 3, California — SYlvan 0-4314

For more facts, use Reader-Reply Card opposite page 18 and circle No. 349

New scraper unit built for biggest grading jobs has capacity almost twice that of present models

■ A new giant rubber-tire scraper unit designed to meet production problems and schedules on multimillion-yard grading jobs is announced jointly by M-R-S Mfg. Co. and the Wooldridge Mfg. Division of Continental Copper & Steel Industries, Inc. The earthmover is said to have almost twice the struck capacity of the largest competitive model.

Capable of carrying 60-ton payloads at speeds up to 35 mph, the Wooldridge M-R-S OS-300B scraper is equipped with broad-base tires—33.5 × 33 front and 37.5 × 33 rear—for extra-high flotation over spongy or loose surfaces. Weight of the heavy unit and payload is distributed over four axles instead of two or three, so that ground bearing pressure per square inch of tire surface is reduced. Besides adding to flotation, this factor is said to reduce haul-road maintenance costs.

Power for the new unit is supplied by the M-R-S 200 Special tractor, a 500-hp prime mover with a V-12 diesel engine capable of delivering full rated horsepower at altitudes up to 5,000 feet. This powerful tractor reportedly cuts down loading time in the cut and speeds the transporting of the load to the fill.

Other features claimed for this earthmoving combination are rugged but simple construction, a high degree of maneuverability, and operator comfort. The scraper combination is said to be designed to assist the heavy contractor in securing maximum production per unit while keeping equipment, labor, and maintenance costs per yard at a minimum.

For further information write either to M-R-S Mfg. Co., P. O. Box 1206, Jackson, Miss., or to the Wooldridge Mfg. Division, Continental Copper & Steel Industries, Inc., Sunnyvale, Calif., or use the Request Card at page 18. Circle No. 103.

Truck-mounted derrick

■ A folder describing the features and application of its Series 3700 hydraulically operated truck-mounted derrick is available from J. H. Holan Corp., 4100 W. 150th St., Cleveland 11, Ohio. Operational, economic, and safety features of the rig are discussed, and a cutaway drawing shows the construction and working principle of the derrick. A performance chart is also included.

To obtain this folder write to the company, or use the Request Card at page 18. Circle No. 77.

Simple cost analysis with electronic sorter

■ The Remington Rand electronic sorter, already seeing wide use in various businesses and industries, is recommended as a valuable business machine for the heavy contractor whose operations cover many projects, big spreads of equipment, large stocks, and hundreds of workmen.

According to the manufacturer, the machine will sort 48,000 alphabetic, numerical, and special-code-punched cards per hour, as well as punched-card coupons and column cards. These cards, on which are coded a contractor's daily or weekly equipment, material, and labor costs, as well as other data, may be quickly sorted to provide a readily accessible cost-analysis record.

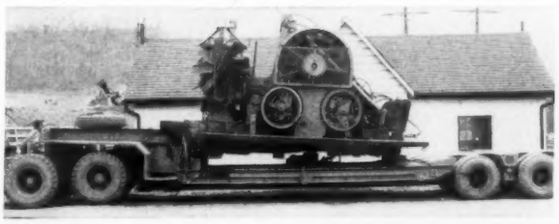
Push-button simplicity makes the electronic sorter easy to operate. The diversity of sorting and classifying jobs it is said to perform give it wide application.

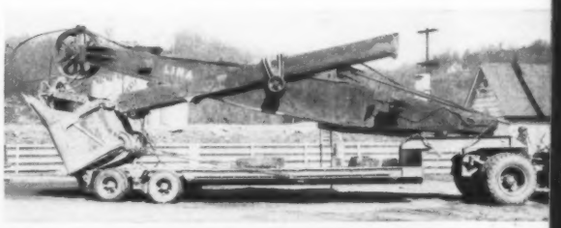
For further information write to Remington Rand, Division of Sperry Rand Corp., 315 Fourth Ave., New York 10, N. Y., or use the Request Card at page 18. Circle No. 91.

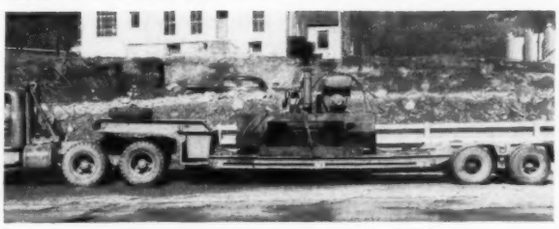
C. F. Replogle Co. reports:

"4 yd. LIMA 1601 knocked down, trucked 125 miles and reassembled in 3 days"

C. F. Replogle of C. F. Replogle Co., Circleville, Ohio, writes: "We really benefit from the fact that our new 4-yard Lima 1601 shovel knocks down for over-the-road transfer from job to job. We've knocked it down, moved it 125 miles and reassembled it in three days' time. During the eight months we've had it, the 1601 finished shovel work on three jobs and started a fourth.







"The Lima 1601's 400 hp diesel with torque converter 'toys' with a 4-yard rock bucket. It eliminates the necessity to 'clutch' the hoist, and multiplies hoist line pull under load to maintain hoist speed. Cable, gear and shaft breakage due to shock loads are eliminated. The machine consistently loads one E-18 Tournarocker (10 plus pay yards) per minute.

"The new 1601 even digs laminated rock that would usually require drilling and shooting. And its rugged construction cuts maintenance costs. To date, our 1601 has loaded out over 800,000 yards of rock without a single mechanical failure. We got all this for an original capital investment considerably less than we'd spend for other like capacity machines."

You can get all these benefits with the new Lima Type 1601! Send today for our new booklet containing detailed specifications. Write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio . . . or see your nearby Lima distributor.

BALDWIN BLH LIMA-HAMILTON

LIMA SHOVELS · CRANES · DRAGLINES · PULLSHOVELS

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Construction Equipment Division · LIMA · OHIO · U. S. A.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

For more facts, use Reader-Reply Card opposite page 18 and circle No. 351

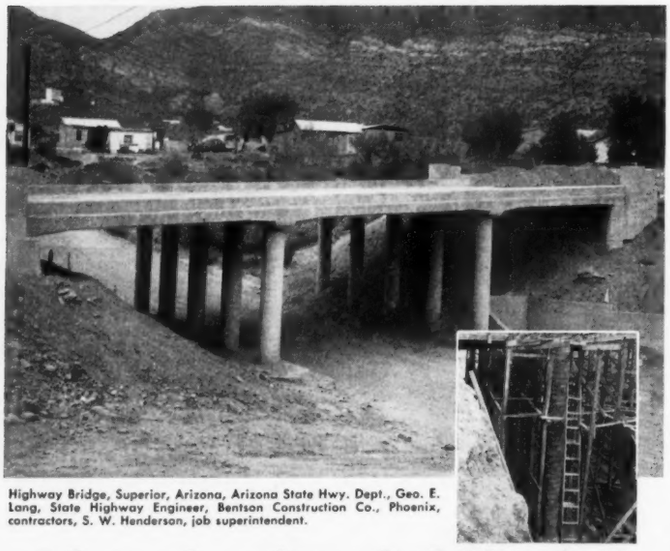
Safeguarding both motorists and game, this Cyclone fence being erected atop a 35-foot cut along the New York Thruway will divert deer from crossing the busy superhighway. Twenty-three miles of this 7-foot-high barrier are being erected. For details circle No. 144 on card at page 18, or write to Cyclone Fence, American Steel & Wire Division, U. S. Steel Corp., Waukegan, Ill.

Airlifting this Barber-Greene Mixall from Chicago to an air force base in Georgia for an emergency maintenance job presented no problem. Once the pressure in its tires was reduced, this 7-foot-7-inch-high dryer-mixer easily cleared the door of the C-119 "Flying Boxcar." For details circle No. 148 on card at page 18, or write to Barber-Greene Co., 400 W. Highland Ave., Aurora, Ill.

SONOTUBE®

FIBRE FORMS

for round columns of concrete



Highway Bridge, Superior, Arizona, Arizona State Hwy. Dept., Geo. E. Lang, State Highway Engineer, Bentson Construction Co., Phoenix, contractors, S. W. Henderson, job superintendent.

Labor-saving columns for bridge piers!

...low cost SONOTUBES® make it possible

SONOTUBES were used to form the round concrete pier columns for the Arizona State Highway Department bridge at Superior, Arizona.

Quick-time and material-saving erection was only one of the many advantages gained by the use of these fibre forms. Form oiling was completely eliminated; forms were easier to strip and the resulting concrete surface was smooth and dense and no hand rubbing was required.

These 24' SONOTUBES, 24" I. D., were poured in one rapid, practically continuous, operation.

Save time, money and labor . . . use SONOTUBE Fibre Forms to erect round columns of concrete!

Available in 26 sizes from 2" to 36" I. D. up to 50' long. Can be ordered in specified lengths or sawed to your requirements on the job.

Use Sonoco's patented "A-Coated" Sonotubes for finished columns; wax coated also available.

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See our catalog in Sweet's

for complete technical data and prices, write

SONOCO PRODUCTS COMPANY
Construction Products Division
LOS ANGELES, CAL. — HARTSVILLE, S. C. — MAIN PLANT — MONTCLAIR, N. J.
AKRON, IND. — BRANTFORD, ONT.

MEXICO: Sonoco de México, S. A., Apartado 10239, México, D. F.

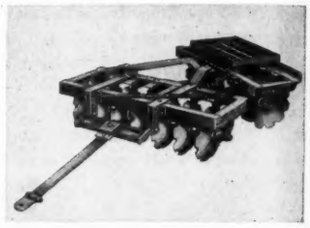
For more facts, use Reader-Reply Card opposite page 18 and circle No. 352

Heavy-duty disk plow prepares soil for fill

■ A new disking plow designed for use on such jobs as cutting fill on dams, levees, and roads, and for loosening dirt in pits, is announced by Towner Mfg. Co., Santa Ana, Calif.

Giant 28-inch-diameter high-carbon steel disk blades, supporting 300 to 400 pounds of plow per blade, reportedly gives the Towner Scari-Plow the toughness to do hard jobs easily and efficiently. Each disk blade has 10 razor-sharp notches, and the tremendous pressure with which the blades contact the ground is said to insure good penetration of the soil.

According to the manufacturer, the Scari-Plow is ideally suited to loosening dirt for fill, as it leaves the soil loose and finely broken, and eliminates large chunks which tend to clog the apron of the scraper. Soil is cut so finely that no matter how small the fill the dirt can be spread evenly. In binding layers of soil, the disk plow churns the soil so that layers are blended and there is no danger of lamination. In this, as in soil packing, the mixing action of the disk blades eliminates air pockets, thus preparing the soil so that it packs better.



The Towner Scari-Plow disking unit.

Because the low draft line of the Scari-Plow assures equal penetration of all disk blades, the plow is said to perform excellently in mixing water into the lower layers of soil on highway or dam projects.

For further information write to the company, or use the Request Card at page 18. Circle No. 6.

Save gas, gears, tires.....

GET MAXIMUM USE FROM YOUR 4-WHEEL DRIVE!

APPROVED Jeep EQUIPMENT

WARN *Automatic* HUBS MAKE 2 TRUCKS OUT OF 1

Road or no road, Warn *Automatics* give your 4-wheel drive sensational new economy, driving ease and mobility. Your 4 W. D. is automatically a "free-wheeling" 2-wheel drive, or 4-wheel drive AS YOU SHIFT! Use it as a town car, "pick-up" or work horse in and out of mud, sand; on and off the highway. It "free-wheels" or "4-wheels" to suit conditions AS YOU SHIFT! What's more, you can drive at *high speed* in 4-wheel drive on any terrain! Automatic (and Locking) models for *all* makes of 4 W. Ds. from ½ to 1½ tons. Ask your *authorized* factory truck dealer for a FREE DEMONSTRATION of amazing Warn Hubs, or write:

WARN *Automatic* HUBS

WARN MANUFACTURING CO., Riverton Box 6064-C11, Seattle 88, Washington

For more facts, use Reader-Reply Card opposite page 18 and circle No. 353

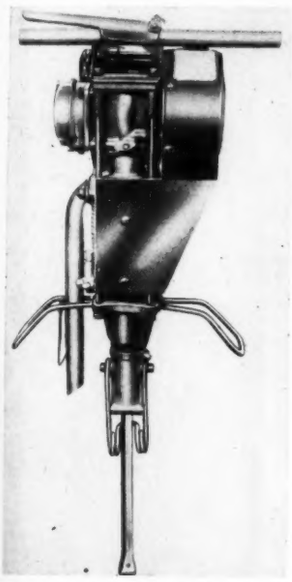
Utilizing the hydraulic system of the International 300 tractor, this Davis Model 102 front-end loader performs a variety of operations with its 11-cubic-foot bucket and other standard attachments. The loader features twin dump cylinders with down pressure. For details circle No. 147 on card at page 18, or write to Mid-Western Industries, Inc., 1009 S. West St., Wichita, Kans.

Dwarfed by the hugeness of the machine, a youthful sightseer peers in the bowl of a Tournapull Model B 35-ton-capacity rear-dump, part of a $500,000 equipment display held at Peoria, Ill. It's a big bowl, too—14 feet 4 inches long, 8 feet 4 inches wide, and 8½ feet deep. For details circle 145 on card at page 18, or write to LeTourneau-Westinghouse Co., 2301 N. Adams St., Peoria 2, Ill.

New gasoline-powered rock-drilling unit

■ An improved self-contained gasoline-hammer rock drill has been added to the line of power tool equipment manufactured by Syntron Co., 227 Lexington Ave., Homer City, Pa.

The Model RD-55 is said to drill to a depth of 13 feet at a rate of approximately two feet per minute when using Syntron hollow drill steels with carbide tips.



The Syntron Model RD-55 gasoline hammer rock drill.

In addition to providing automatic rotation of the drill steels, air compressed by the reciprocating hammer or striking piston will blow the dust and cuttings out of the hole. This latter feature prevents jamming or sticking of the drill steel in the hole, according to the manufacturer.

Three sets of hollow carbide drill steels are available for this new model. Short sets use 2, 4, and 6-foot steels with 1 3/16 to 1 3/8-diameter bits. The long sets use 8, 10, and 13-foot steels with 1 3/16 to 1 1/4-inch-diameter bits.

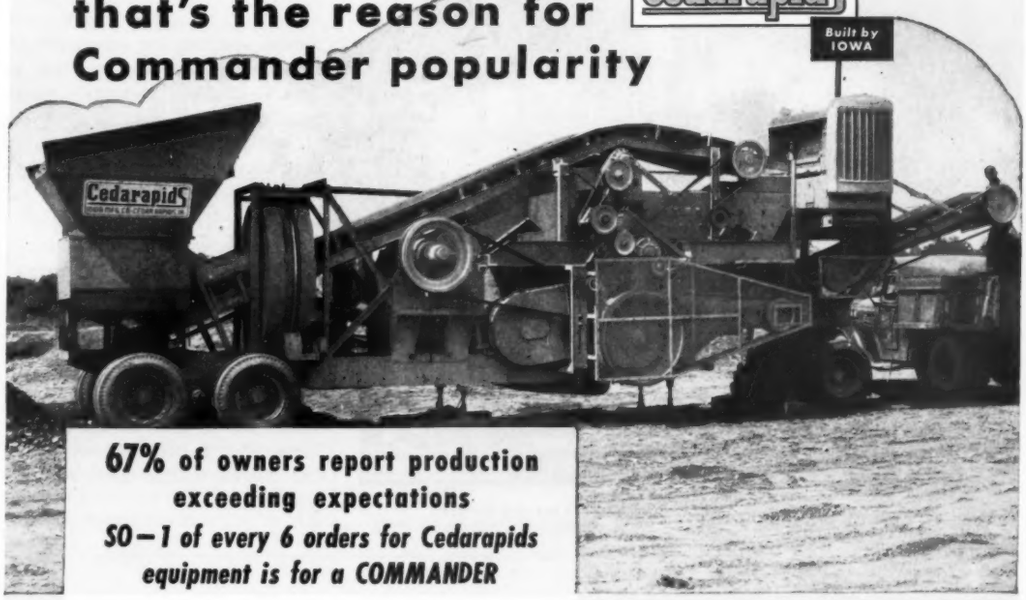
For further information write to the company or use the Request Card that is bound in at page 18. Circle No. 189.

BONUS PRODUCTION

that's the reason for Commander popularity

Cedarapids

Built by IOWA



67% of owners report production exceeding expectations

SO—1 of every 6 orders for Cedarapids equipment is for a COMMANDER

420 tons per hour producing ⅞" with 15 to 20% crushing . . . 400 tons per hour of 1¼" material with 12% crushing . . . 275 tons per hour of 1" material with 20% crushing! These are typical reports received from Cedarapids Commander owners all over the world. It is little wonder that it is the most popular aggregate producing plant with contractors and pit operators today.

Join the growing group of satisfied Commander owners. You will have a machine that was designed to meet the conditions of modern road building that call for higher percentage of crushing of pit material, finer aggregates and lower operating costs. See your Cedarapids distributor today for the complete story.

FEATURES THAT MEAN PROFITS FOR OWNERS

- ***New 30" x 25" Secondary Roll Crusher***
  This new roll crusher provides 12% more secondary crushing yet handles the same size feed. This new larger size balances the high screening capacity of the Commander's big screen.
- ***Large Horizontal Vibrating Screen***
  To handle the higher percentages of secondary crushing, the big 48" x 10' 2½-deck screen gives the Commander 30% more screening capacity than plants of comparable size. The Cedarapids Horizontal Vibrating screen provides most accurate grading and allows lower overall height.
- ***Efficient 10" x 36" Jaw Crusher***
  The high primary crushing output of this unit keeps the plant operating at peak capacity. Cedarapids Jaw Crushers are of a forced feed overhead eccentric shaft design engineered for extra-high capacity and low cost performance.
- ***Wide 30" Conveyors***
  Feed conveyor, delivery conveyors and undercrusher conveyor are extra wide to handle the greater capacity of the Commander. Channel conveyor frames combine light weight with exceptional strength.

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U.S.A.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 354

Doing double duty right from the start, this Ross straddle carrier handles erection steel for the plant in which it will eventually be used to transfer steel billets from one mill to another. For details circle No. 149 on card at page 18 or write to Ross Carrier Division, Clark Equipment Co., P. O. Box 358, Benton Harbor, Mich.

A joint sealer with high resistance to the solvent action of jet fuel is used on a runway at Blytheville, Ark., Air Force Base. The sealant, Presstite No. 99, is also said to resist being blasted or melted out of the joints by engine thrust or after-burners. For details circle No. 150 on card at page 18, or write Presstite Engineering Co., 3798 Chouteau Ave., St. Louis 10, Mo.

Super **VULCAN**
Differential Acting Pile Hammers Drive Toughest Piles

Positive action . . . simple design . . . rugged strength. Specialized power for driving the heaviest, longest and most difficult piling.

Write today for complete details and name of nearest dealer . . .

VULCAN *IRON WORKS*
327 NORTH BELL AVENUE
CHICAGO 12, ILLINOIS

For more facts, use Reader-Reply Card opposite page 18 and circle No. 355

Diesel electric sets

■ Compact and versatile, a new line of small Caterpillar diesel electric sets is described in a booklet from Caterpillar Tractor Co., Peoria 8, Ill.

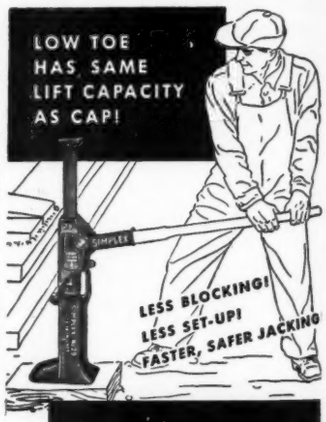
In four illustrated pages, this booklet describes the advantages of these sets, which are matched to their Cat engines to provide maximum efficiency.

To obtain Form 31649 write to the company, or use the Request Card at page 18. Circle No. 186.

Lt. Col. T. G. Harton appointed to Vicksburg

The appointment of Lt. Col. Thomas G. Harton as assistant district engineer of the Vicksburg District, U. S. Army Corps of Engineers, has been announced. Recently returned from Pusan, Korea, where he was post engineer, Col. Harton has been touring the district, visiting major jobs and area offices.

GET 19" LIFT from 2½" CLEARANCE!



SIMPLEX
RATCHET LOWERING
JACKS
Lift or Lower the Load Notch by Notch—cannot be Tripped.

With Simplex Ratchet Lowering Jacks minimum toe clearance is necessary. Loads are usually lifted from the ground to the toe of the jack by pinch bars or wedges. Only Simplex Jacks provide equal lift capacity on toe or cap. No other jacks offer such a combination of low cost and all-purpose utility. In fast jacking action—extra-safety features—and rugged strength for longer life, Simplex Ratchet Lowering Jacks give you more for your money! Available in capacities of 1½ to 35 tons. Write today for Bulletin: Industrial 49.

SAFETY SUGGESTION—Use thin wood block—Don't lift or lower steel against steel.

Simplex
LEVER • SCREW • HYDRAULIC
Jacks

TEMPLETON, KENLY & CO.
For more facts, circle No. 357
CONTRACTORS AND ENGINEERS

It's no secret why more and more fleet owners are standardizing on
TRANSCRETES®
They simply put *more* and *better* concrete in the forms . . . in *less* time . . . at *less* cost . . . for *BIGGER PROFITS!*

3½ to 7 Yard Capacities

Write for NEW, FREE Bulletin TM 1055

CONSTRUCTION MACHINERY COMPANY • Waterloo, Iowa

For more facts, use Reader-Reply Card opposite page 18 and circle No. 356

First to be operated in the Pacific Coast area, this Cummer asphalt plant turns out between 50 and 60 tons of mix per hour for the Gallagher Construction Co., Corvallis, Oreg. The unit is only one of a complete line of batch plants offered by Cummer. For details circle No. 151 on card at page 18, or write to the F. D. Cummer & Son Co., 1827 E. 18th St., Cleveland 14, Ohio.

Diesel power helps pave the way on the Detroit Expressway, as indicated by this GMC tandem dump truck hauling aggregate to a portion of the expressway under construction. This Model DW634-47 truck is powered by a GM 4-71 diesel engine. For details circle No. 146 on card at page 18, or write to GMC Truck & Coach Division, General Motors Corp., 660 South Blvd. E., Pontiac 11, Mich.

NOW

A SAFER FASTER MORE RUGGED SNATCH BLOCK

THE NEW LEBUS "TRUCKER'S" SNATCH BLOCK

Undoubtedly the Finest Snatch Block ever designed, constructed and presented to the industry. This new LeBus Block has been engineered for all types of heavy trucking, construction and rigging work. Special emphasis has been placed on *STRENGTH, SAFETY and EASE OF OPERATION.* Only TOP QUALITY carbon and alloy steels are used in the construction and all parts are drop forged, heat-treated and processed to withstand the most rugged service. Like previous LeBus blocks, the new "Trucker's" Snatch Block requires no tools other than your hands, and can be taken completely apart within a matter of seconds.

For more information write direct or have your supply source write for catalog page 1500 for complete information on the four sizes of LeBus Blocks.

LEBUS

LEBUS ROTARY TOOL WORKS, inc.

Phone Plaza 9-2771

P. O. BOX 2352 • LONGVIEW, TEXAS

For more facts, circle No. 358

LeTourneau-Westinghouse fills four positions

Jack McCann and Jack Errion have been made government sales manager and sales promotion manager, respectively, by LeTourneau-Westinghouse Co., Peoria, Ill. Mr. McCann, formerly manager of the company's Washington, D. C. office, will direct activities of the government-sales department. Mr. Errion's new job entails working with sales forces and distributors.

New to the company are E. L. Cline, central sales manager, and John Herrick, western service manager.

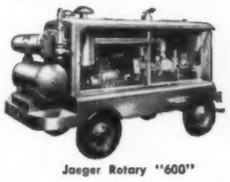
Kaiser names C. I. Little

Managing the erection department of Kaiser Steel Corp.'s fabricating division plant in Montebello, Calif., is C. I. Little. A former structural sales engineer, he has over 35 years' experience in the steel-fabricating industry.

Kaiser's home office is in Los Angeles.

Trenching 7 miles of street, this Jaeger "125" Roto ran two 80 lb. breakers to line-cut and break a 7" top of asphalt over brick—averaged 1200 sq. ft. per 8 hr. day—used only 1½ gals. of fuel per hr.

Jaeger "125" Rotary speeds street work



Jaeger Rotary "600"

Instantaneous air delivery, under close and smoothly modulated control, enables the Roto 125 to maintain 100 lbs. minimum pressure under all demands up to 125 cfm. High efficiency results in slower speed operation, less fuel consumption, longer engine life than any other rotary. See your Jaeger distributor or ask for Catalog JCR5.

THE JAEGER MACHINE COMPANY 701 Dublin Ave., Columbus 16, Ohio

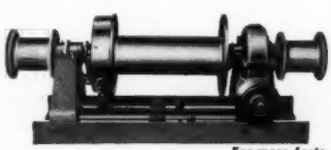
LOADER • PUMPS • MIXERS • TRUCK MIXERS • PAVING MACHINES

For more facts, use Reader-Reply Card opposite page 18 and circle No. 359

Why Break your Back?

USE TULSA* WINCH

Drillers, helpers and pushers all agree that Tulsa Winch makes work around the rigs easier, safer and quicker. Whether they are skidding a 500 ton rig or moving a drill bit, Tulsa Winch can handle the job. 28 models for all makes and models of trucks and crawler tractors.



Tulsa* Winch

TULSA, OKLAHOMA DIVISION OF VICKERS Inc.

*Reg. U. S. Pat. Off.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 360

Forming for floor-slab pours becomes a speedy, economical process with new K clips hooked over Jones & Laughlin Junior beams and supporting plywood form board.

Time and cost-saving floor-forming procedure uses disposable clips hooked to junior beams

■ A new forming technique which uses a two-ounce cast-iron clip with lightweight steel structural members is said to save time, materials, and labor in the installation of concrete floors. Known as the K System, the new technique is reported to have saved an estimated $90,000 in the construction costs of a 12-story apartment building in New York City.

According to Jones & Laughlin Steel Corp., manufacturer of the junior beams used in this process, the system solves a problem that has plagued building contractors for many years: how to install and remove forms for concrete flooring without resorting either to makeshift or to time-consuming procedures.

The K System, developed by Edward S. Klausner, a New York City professional engineer, involves the hooking of small cast-iron clips—about three inches long—over the top flanges of the junior beams. Plywood rests on the clips and serves as a ready-made form for the concrete. After the concrete is poured and cured, workmen go along the underside of the flooring and knock off the exposed section of the clip. Part of the clip remains permanently in the floor. The plywood form drops down and can be re-used as many as 20 times.

After concrete has set, the bottom portion of the K clips is easily broken off, permitting the plywood forms to drop free and ready for re-use.

Contractors who have used the K System report that it not only saves time and materials, but also gives the structure additional rigidity because the clip allows the concrete to come below the top flange of the junior beams.

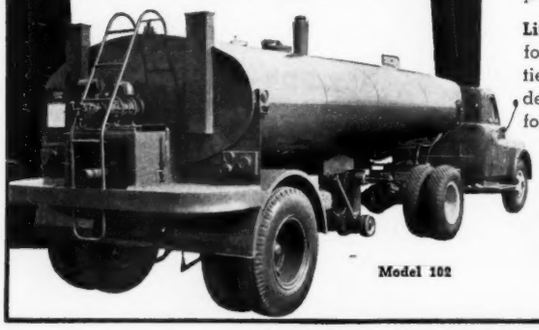
Most junior beams used on the recent New York City project were 16 feet long and were placed approximately two feet apart. When the concrete pouring was about to begin, a workman went along the junior beams and placed a clip approximately every 2½ feet. Then two ready-cut 8-foot plywood boards were placed between the beams. The plywood was ⅝ inch

LITTLEFORD

BITUMINOUS SUPPLY TANKS

- Big capacity
- Wide choice of sizes, mountings and accessories
- Easy operation
- Littleford quality-built
- Hard-wearing, long-lasting

Model 103



Model 102

Littleford Supply Tanks are your most efficient means of hauling hot or cold bituminous materials from the source of supply to your Littleford Pressure Distributors, Trail-O-Distributors, stationary or travel mixing plants, bulk storage or asphalt mixing machines.

Littleford engineered and quality-built, they'll last for years, cost you less to own and operate. Capacities from 2000 to 5000 gallons. Single or tandem axle design. Complete line of accessories available. Send for Supply Tank bulletin AA-25.

LITTLEFORD

LITTLEFORD BROS., INC.
485 E. Pearl St., Cincinnati 2, Ohio

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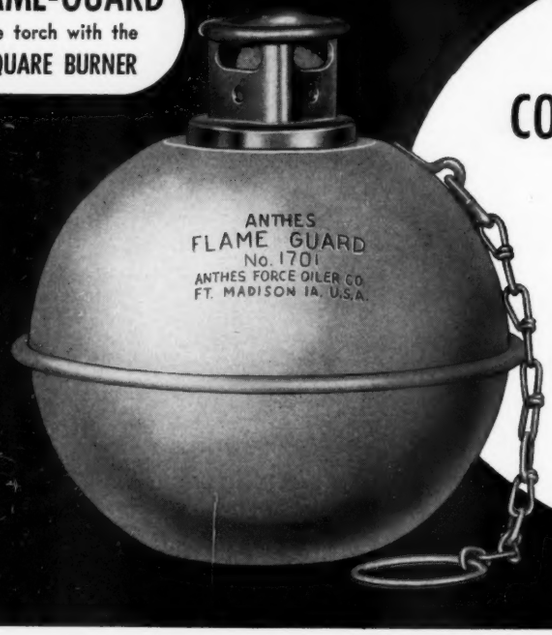
FLAME-GUARD
the torch with the
SQUARE BURNER



NEW! Anthes
CONSTRUCTION TORCH

Anthes—long famous for truck highway safety equipment including oil flares—now offers you FLAME-GUARD—a new self-righting torch with an exclusive square-type burner. This unique burner with umbrella style hood stays lit under most adverse weather conditions. Red baked enamel body and aluminum baked enamel burner. Write for complete details.

THE WEATHERCAP

Vertical exhaust pipe protection for all sizes of engines. Cuts maintenance costs. Recommended and used by well-known equipment manufacturers.

Anthes FORCE OILER CO.
Fort Madison, Iowa

For more facts, use Reader-Reply Card opposite page 18 and circle No. 362

thick. A single layer of welded steel wire mesh was used to reinforce the two-inch layer of concrete. After the concrete had set, the exposed part of the cast iron clip was knocked off. Although the clip sustains a heavy normal load, it will not take a shock blow. The plywood dropped down and was re-used. More than 45,000 clips were used on the building, approximately one for every 2 square feet of construction.

Another advantage of the new forming technique is that a junior beam is light enough for two men to carry. The men hold the beam with one hand and place the bolts with the other hand. The light weight also means that a crane or derrick need not be tied up placing secondary structural members.

The clips used in the K forming system are cast by the Crompton Knowles Loom Works, Worcester, Mass.

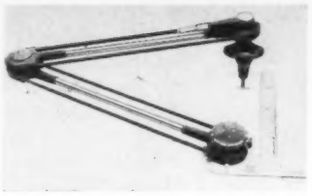
For further information about these concrete-form clips or junior beams, write to Jones & Laughlin Steel Corp., 3 Gateway Center, Pittsburgh 30, Pa., or use the Request Card at page 18. Circle No. 42.

Small crawler tractor

■ Literature describing the Model OC-3 crawler tractor and its line of attachments is available from the Oliver Corp., 400 W. Madison St., Chicago 6, Ill.

A 16-page booklet illustrates the features and applications of the Model OC-3, which has a drawbar-horsepower rating of 21.85, three forward and one reverse speeds, and is available with either wide or narrow-gage tracks. A loader, a trencher, a sideboom, and other attachments also are pictured and described.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 191.



Improved machine cuts drafting time

■ Operational features said to permit greater speed, accuracy in drafting, and ease of handling are incorporated in the new Vemco drafting machine offered by the V. & E. Mfg. Co.

The new Vemco combines in a single unit the T-square, 45-degree triangle, 60 and 30-degree triangle, precision mechanical protractor, and scales.

Two basic models are offered: the standard, for mechanical and architectural drawing and for general all-around drafting, and the civil engineer's model for extreme accuracy in map making.

For further information write to the V. & E. Mfg. Co., Box 950M, Pasadena 20, Calif., or use the Request Card at page 18. Circle No. 132.

Ohio Turnpike tolls now based on gvw

Tolls on the Ohio Turnpike are now based on the gross weight of a vehicle plus the distance travelled. An electric beam picks out the number of axles on a vehicle, and weighs each one while it is in motion. A machine combines the axle weights, punches a toll ticket showing to which of the eight classifications the vehicle belongs, the time of entry, and other data needed for audit purposes. The system, recently devised by International Business Machines Corp., New York, N. Y., is being used for the first time on the Ohio Turnpike.

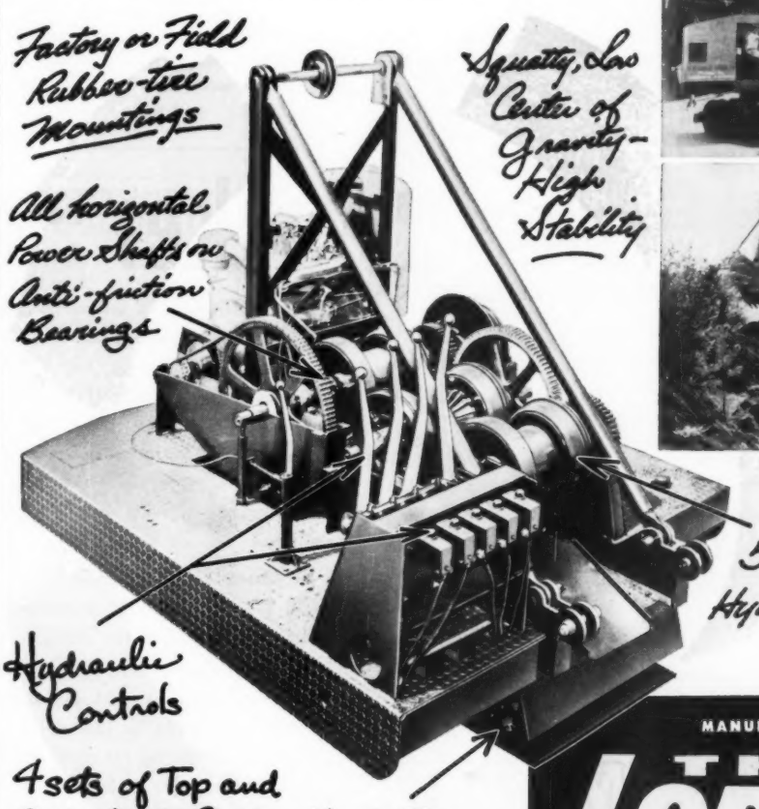
A combined microwave-mobile radio system to provide communication between police, maintenance, and administrative forces has also been installed on the turnpike by Radio Corporation of America, Camden, N. J. The system provides eight voice and teletype channels and will link all major installations and vehicles.

THE NEW THEW LORAIN®

MODEL DIXIE

A NEW 3/8-YD. MODEL MADE, SOLD, SERVICED BY THEW-LORAIN

The acquisition of the 3/8-yd. "Dixie" model adds another go-getter to the Thew-Lorain line of products. Now manufactured by Thew, the "Lorain-Dixie" is competitively low-priced; doesn't have to back down on any comparison of quality. This proved 3/8-yd. machine now proudly carries the "Lorain" nameplate . . . is backed by all the handy parts stocks and service know-how of Thew-Lorain's entire nation-wide distributor organization. Get the facts today, because you'll be surprised at how much sheer quality and money-making performance you can get for so little money.


Factory or Field Rubber-tire Mountings
Squatty, Low Center of Gravity—High Stability
All horizontal Power Shafts on Anti-friction Bearings
5 interchangeable Hydraulic Clutches
Hydraulic Controls
4 sets of Top and Adjustable Bottom Hook Rollers

MANUFACTURED BY THEW LORAIN®

THE THEW SHOVEL CO., LORAIN, OHIO, U. S. A.

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Before You Buy—Better See What FLINK Offers in ICE CONTROL SPREADERS

Hydraulic tailgate type

LMC Hopper type

Pull type

Check the Features on The New 1956 FLINK Ice Control Spreaders

Sold and serviced through reputable road equipment distributors

Dept. 5508

THE Flink Co. FLINK COMPANY STREATOR, ILLINOIS

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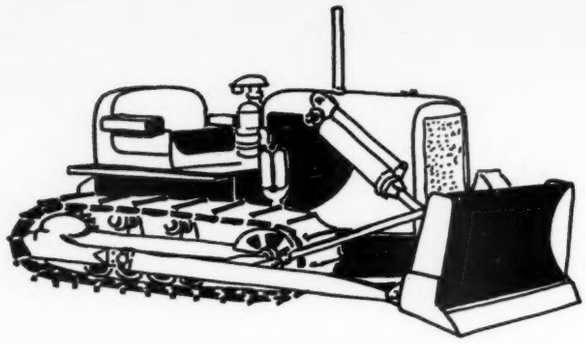


This is the eighth in a series of articles consisting of selected excerpts from the 1,280-page book, "Moving the Earth," by Herbert L. Nichols, Jr., published last March. Priced at $15, the book is available through the Book Order Department of CONTRACTORS AND ENGINEERS, 470 Fourth Ave., New York 16, N. Y. A copy may be ordered on approval by circling No. 1 on the Request Card at page 18. Approval copies will be billed at $15 plus postage.

Access and gravel roads

Pioneer roads, or access roads, are built along the route of a highway, pipeline, or other heavy construction project to allow the movement of machinery and equipment to and between different sections of the job. If such a road is required, it should be the first work undertaken, as any delays in cutting it through will slow the starting of the job and may keep men and equipment idle.

It is best to locate such a road sufficiently to the side so that it will not be blocked or cut off by the main work, and if it must cross the construction strip it should do so where it is close to grade.

The importance of the pioneer road decreases as sections of the main road become passable for trucks, but it often retains at least emergency or detour value until the job is finished.

If it is to be used only for moving in equipment, the pioneer road may be narrow, crooked, and steep for the sake of economy or haste. Written specifications and a survey of the route serve as guides rather than instructions, and the job supervisors are usually given wide latitude in altering them for the sake of speed or economy.

Pioneer roads are most often needed in mountainous and timber country where severe obstacles hinder cross-country travel. Where fill is available, trees are cut flush and the stumps buried; otherwise they are uprooted and the holes graded in. Topsoil is handled as fill.

Rock is avoided as much as possible in the layout of the road, and when found is often buried instead of blasted. If an excessive amount of rock must be moved, it may be economical to place the pioneer road in the route of the highway, as the cost of the separate blasting may outweigh the advantage of the independent road.

Grades follow the land contour as closely as possible. The maximum grade will depend on the use. Shovels, tractors, and lightly loaded trucks should be able to negotiate grades up to 30 per cent, but serious delays can be caused by stalling of weak units, or as a result of skidding. Ten to fifteen per cent grades are more practical.

Curves should be wide enough to enable the longest units to get around them, and the machines in steady use should be able to make them without backing. Attention should be paid to

ANOTHER MARION FIRST!

Improved Double Arm Hoists Now Equipped With NEW LEAKPROOF COMBINATION RINGS!

Again Marion leads the way with major hoist improvements, including a new leakproof seal.

The seal is a combination iron ring plus special underseals that more nearly than any other ring mechanism eliminates creeping. Actual tests carried on with a full body load showed virtually no creeping in 48 hours.

Other major improvements on Models 621-A2, 721-A2 and 726-A2 include outside body guides . . . increased flexibility in the sub-frame without loss of strength . . . increased clearances at base of cylinder, making it easier to service valve and pump.

Here is another example of Marion's leadership and advanced designing. Get all the facts from your nearby distributor or write direct today.

"Designed on the Job" MARION BODIES AND HOISTS

MARION METAL PRODUCTS CO., MARION, OHIO, U. S. A.

A complete line of standard and special hydraulic hoists and dump bodies to fit every need.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 365

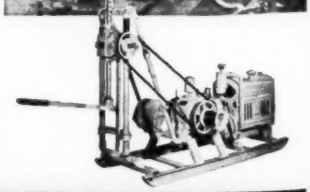
acker Portable, Power Operated Soil Sampling Rigs

Acker power operated soil sampling rigs combine into a compact, portable unit a standard power plant together with powerful hoisting winch and pump. Two models are available—Acker Model RGT for light duty and Acker RG for heavy duty service. These relatively inexpensive units are ideal for soil sampling, jetting and driving pipes or piles.

More for Your Money!

Add an Acker rotary drill head for rock coring and foundation test boring.

The Acker Model SK rotary drill head when combined with Acker RGT and RG rigs make an ideal unit for rock coring and foundation test boring. For complete information, write today for bulletin 28-C&E.



ACKER DRILL CO., INC.
725 W. Lackawanna Avenue
Scranton, Penna.

A complete line of Soil Sampling Tools Diamond and Shot Core Drills, Drilling Accessories and Equipment.

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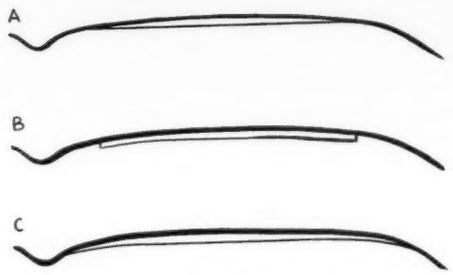


Types of gravel-road construction, illustrated by these cross-section drawings, include (A) feather edge, (B) trench, and (C) full width.

the lane width needed, so that inside rear wheels will not run off the road. Width requirement increases with length of wheelbase and sharpness of turn.

The road width is determined by its intended traffic, construction problems, and the necessity for haste. It is desirable that it be two lanes wide, but this is often not practical. On steep slopes, two one-way roads may be constructed, one above the other.

Two-way traffic on one lane will require turnouts every 200 to 500 feet.

Small streams are best bridged with corrugated metal culvert pipe and fill. Occasionally, bottoms may be hard enough to permit easy fording.

Fords are the most economical means of crossing larger streams. A soft bottom can sometimes be made safe by a rock fill. Its downstream edge should contain heavy boulders.

If a ford is not practical, multiple culvert pipe, log or timber bridges or trestles, or prefabricated steel bridges may be used.

Roads built for use in a dry season may be so constructed that they will be washed out when the rains come if the contractor believes they will have served their purpose by then.

The bulldozer, or angledozer, is usually the primary tool for cutting a pioneer road.

In sidehill cuts, the road surface should slope down to the bank or inner side, and may also have a berm along the outer edge. This construction allows for fill settlement, reduces washing of the fill slope, and decreases the danger of machinery sliding off the road.

Drainage from the road surface and the hill slope is carried along the inside bank to culverts, or to outward dipping sections of road reinforced with rock or blacktop. Overhangs or sluices must be provided to carry the water across the fill.

Access roads

A pioneer road is an access road for each otherwise isolated piece of the job it services. However, the term access road usually means a road by which a whole job is connected to a highway system, and is generally used in connection with pits and dams.

The quality of construction is variable. If the project is small, or to be quickly finished, and no substantial amount of raw material is to be trucked in or products taken out, rough pioneer construction may suffice. More often, it must be built as a haul road. Occasionally, a first-class highway will be required.

Haul roads must carry heavily loaded trucks at a good speed, and are ordinarily located according to a favorable terrain, rather than property lines. The haul road will carry a great amount of traffic for a limited time, and then often be abandoned. Grade is sometimes kept as low as 3 per cent of climb in the direction of load movement. Culverts and bridge capacities are designed according to the period of use, and the comparative expense of providing large openings or repairing washouts over smaller ones.

The haul road seldom has long ascents and descents, but switchbacks and side wanders must often be used to get out of a deep pit or over a ridge too massive to be cut. Haul roads may be oiled to control dust and speed traffic. Trouble with snow or ice is minimized by locating on the north or east slopes of valleys.

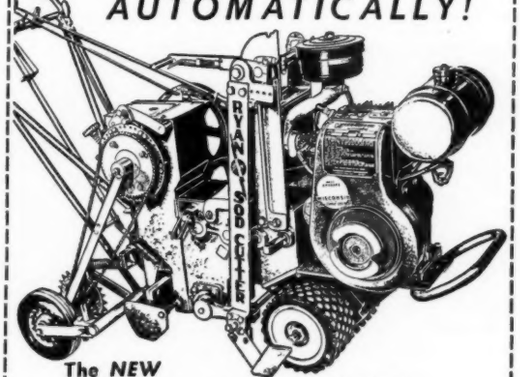
Highways

Highways make up the bulk of the excavating contractors' road work. Modern standards of width, grade, and alignment require heavy cuts and fills in rough or rolling land, and grading and compaction of subgrades involves heavy work on any terrain.

Highways are built to exact specifications, although the engineer in charge is generally allowed some latitude in interpreting them.

Contracts may be let on a basis of

measures and cuts sod to exact length
AUTOMATICALLY!



The NEW Ryan Auto-Cut-Off Model POWER SOD CUTTER
cuts 15 sq. yds. of sod per minute
(and cross cuts in the same operation!)

Here is, beyond doubt, the finest sod cutter ever built. The new Auto-Cut-Off model completely eliminates hand cross-cutting, gives you better quality sod with precision, square-cut ends for easier laying—greater profits. Easily cuts 15 sq. yds. a minute. Available in several sizes. For complete information, write Dept. K-1.

Ryan landscaping equipment company
Quality Built
Division of KIM Machine Works, Inc.
871 Edgerton St.
St. Paul 1, Minn.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 367

FASCINATING! HOSE COMES TO LIFE WITH PUNCH-LOK HOSE CLAMPS!

"A simple operation and Punch-Lok puts your hose in use again," say Doc Punch and Mr. Lok. For complete product and price information, *see your near-by Punch-Lok distributor*, or write direct.

PUNCH-LOK Company
"The sign of a GOOD Hose Clamp"
Dept. J, 321 North Justine Street, Chicago 7, Illinois

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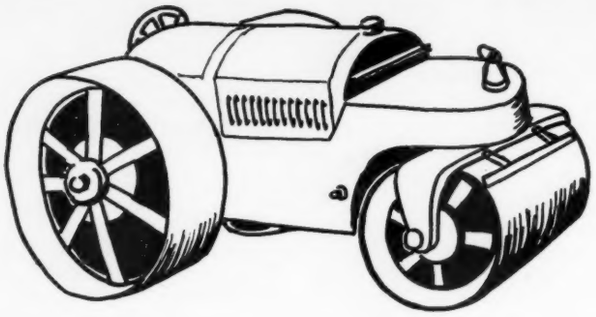

a fixed price for a job; a fixed price plus specified extras, such as allowance for overhaul, rock blasting, slides, or other difficulties whose extent cannot be conveniently estimated in advance; or on a price-per-yard basis. Less frequently, they involve a cost-plus or equipment rental arrangement.

Highway jobs may be resurfacing or paving of existing roads, widening and straightening of roads, building a new road in the approximate location of the present one, building a new road which will run along or cross the old one only occasionally, or a totally new road crossing undeveloped country. There are, of course, no definite lines of distinction among these types.

A requirement of most highway construction is that the contractor provide for continuance of traffic along any roads running along or crossing the job. This may be a controlling factor in job sequence.

An airport runway is essentially a very wide, short, straight road. It is usually located on the flattest land available, but deep fills are often required.

Banks of cut must be graded back to very gentle slopes to avoid choppy air currents.

Borrow is frequently obtained from the glide areas at the ends of the runway. It is standard practice to cut away any ridges which might be hit by a plane climbing slowly off either end of the runway.

The runway may have a level centerline, crowned up from the sides slightly for drainage, or have a flat cross section and a longitudinal slope. In either case, drainage slopes are very slight, and the surface must be exactly on grade to avoid puddles.

Taxiways and plane parking areas are roads surfaced to an ample width to carry the wheels of a plane running on the ground. Additional areas on each side must be cleared and lowered to allow clearance for the wings.

Airport subgrades and pavement may have to exceed standards for heavy truck highways if maximum-size planes are to be carried.

Gravel roads

Bank gravel is a natural mixture of pebbles and sand. For road-building purposes it should contain some fines that will act as a binder. Most deposits contain cobblestones and boulders.

Specifications for road gravel vary greatly. The following spread includes most of them:

Passing	Per cent
2-inch sieve	80 to 100
1-inch sieve	60 to 100
¼-inch sieve	40 to 85
10 mesh sieve	15 to 70
200 mesh sieve (fines or binder)	5 to 25

In general, gravels with over 10 per cent fines are not suitable for roads that will be subjected to freezing. Less than 5 per cent may lead to loosening up in hot, dry weather. However, an increase in the percentage of coarse particles will lessen the softness caused by too much binder. Variations in particle shape and material will also affect results considerably. Increase of depth may make up for weakness.

There is no consistent difference between the parts of gravel banks which are above and below the water table. Water levels were usually different at the time the material was deposited. However, there is very often a difference in color due to above-water oxidation of certain pigments.

Engineers frequently write ideal specifications for gravel which is not obtainable, and contracts are let to use practical grades on a price or availability basis.

Specifications may call for screening gravel to be used in the top course or in the full road depth. Maximum size stones may be limited to 1, 2, or 4-inch diameters.

Screening is desirable to obtain a smooth, easily worked surface, but it often involves wasting of an excessive amount of stone which could be worked into the road. The resulting loss of strength may affect the road's stability, particularly in crossing soft or wet ground.

In general, most oversize stone can be eliminated during the spreading and grading processes at less expense than pit screening, except in patching work.

Bank gravel which is short of peb-

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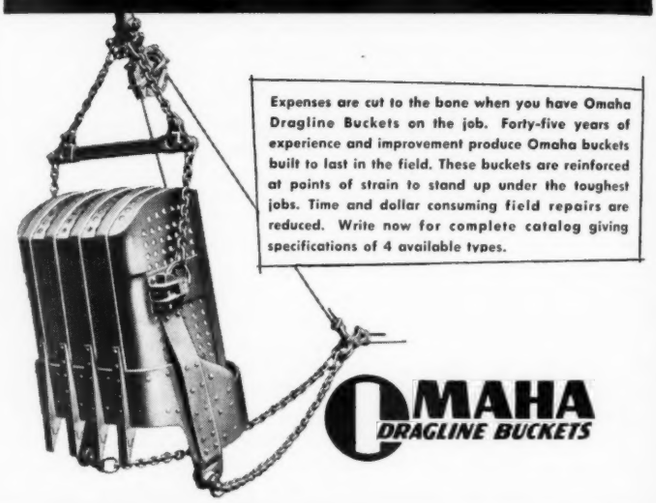

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For further information on the new equipment, new materials, and new literature described in this issue of Contractors and Engineers, check the item number on the Red Request Card bound in at page 18. No obligation, of course, and we will forward your request directly to the manufacturer.

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bles and long on stones, may be run through a crusher to reduce the oversize to pebbles. The result may be superior to run-of-bank of similar size distribution because of the angular shape of the crushed pieces.

Blasted rock which is run through a crusher, without separation of the product, will often produce a material similar in size, distribution, and performance to the best of bank gravels.

Crusher gravel is usually more expensive than run-of-bank because of the extra processing.

Any hard material which is broken into particles of the gravel size range may be used in its place. The breakage may be from blasting, rooting or digging, burning, or the effect of heat and cold. Such materials include soft limestone, fine blasted rock, scoria, clay, disintegrated granite and shale, cinders, and volcanic ash.

Rock from tunnels is particularly suitable for road work as the tight, heavily loaded shots cause fine fragmentation.

Cinders, ash, shale, and some scoria should be used with caution as they produce good immediate results but break down into mud or dust under traffic.

Preparing subgrade

The subgrade should be finished as accurately as possible. Ridges or hummocks of subsoil which extend up into the gravel weaken it. If the subgrade is clay or silt, it is good practice to place a blanket of clean, coarse sand to interrupt capillary flow and add to road stability.

The subgrade should be compacted if it is practical to do so. However, temporary gravel roads are often put across wet spots that are not workable. Rock fill, or extra depth of gravel is used to make up for lack of subgrade preparation.

Cross sections in common use include the feather-edge construction, which calls for a flat subgrade. Its advantage is ease of construction. Disadvantages include poor drainage of water out of the center gravel, deficient strength at the edges, and the necessity of blading fill from gutters or shoulders into the road during maintenance.

The trench section provides center drainage and strength to the outer edge of the gravel. However, frequent bleeder drains through the shoulders may be needed to prevent water from ponding in the edges, soft shoulders may be a hazard in wet weather, and maintenance work will put dirt over the gravel.

The shoulders and gutters may be shaped before laying gravel, or the gravel may be laid and gutters then cut to obtain shoulder material.

The full-width surfacing is the best construction, and is to be recommended wherever the price of gravel is not a controlling factor. It saves the trouble and expense of edging, provides hard shoulders and good drainage throughout the surface, and minimizes maintenance difficulties.

On good subgrades, gravel may be very thin, but it is the best practice to use 6 to 8 inches compacted depth, and to spread it in two layers. On soft ground, the depth may be 12 inches or more. The greater part of deep gravel is usually in the bottom layer.

The best gravel available should be in the top layers. It should not contain many stones larger than 1 or, at the most, 2 inches in diameter. It should be coarse enough to resist the action of tire suction, water, and wind, and should have enough binder to hold it in dry weather, but not enough to make it sloppy under wet or thawing conditions.

In the bottom, stones up to two-thirds of the layer thickness can be tolerated. Clean sand without stone may serve if the top layer is thick and bound well enough to hold it together.

Gravel is ordinarily trucked in and spread by a dozer or grader. Occasionally, hauling and spreading can be done by scrapers.

Each layer should be thoroughly compacted by pneumatic-tire or steel-wheel rollers, or traffic. A heavy steel roller will work back into the gravel stones pulled out by spreading work. Larger stones are thrown to the side to be taken away later. They are easier to remove if roughly piled rather than scattered along the edge.

The top layer may be dragged with a spike-tooth harrow to turn out stones that might interefere with grading.

Minimum crown is 4 inches for a 20-yard road; 6 inches is more satisfactory.

(To be continued next month)

Colorado Fuel & Iron offers eight new films

The production of steel and finished steel products such as wire rope and grader blades is described in a series of eight new films produced by the Colorado Fuel & Iron Corp., New York, N. Y. The 16-mm sound-color movies are available on loan to schools and various organizations.

The films may be obtained from the New York Advertising Department, Colorado Fuel & Iron Corp., 575 Madison Ave., New York 22, N. Y.

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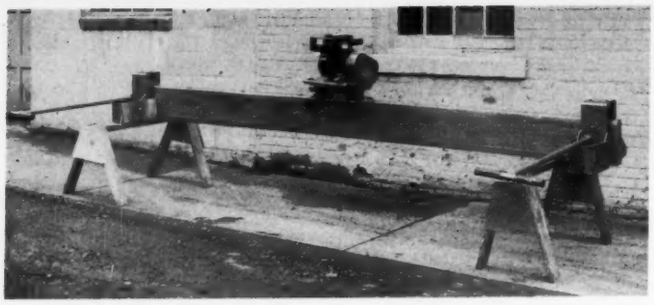


This prestressed screed beam, designed for use with the Stow vibrating screed assembly, may be built economically in any contractor's shop. Complete instructions are available from the Stow Mfg. Co.

Easy do-it-yourself plan offers contractors design for shop-built vibrating screed beam

■ The increasing use of vibrating screeds in concrete-finishing work has been given impetus by Stow Mfg. Co. with announcement of a simple design for a shop-built prestressed screed beam. Complete instructions for building the beam are available to contractors without charge.

This do-it-yourself development, which enables the contractor to build a beam of any required length for use with the Stow vibrating screed assembly, is said to represent both a solution to some long-standing vibrating screed problems and a substantial saving in equipment costs.

The design of this new screed beam calls for a wooden beam with a piece of steel channel bolted to the bottom of it. Before the channel is attached, a slight crown is cut in the bottom of the beam. When the channel is tightened up against this crown, the beam is prestressed. The weight of the engine and vibrating unit is just enough to cause the beam to give a little, making the bottom edge perfectly straight. The steel channel gives a smoother surface and prolongs the life of the beam.

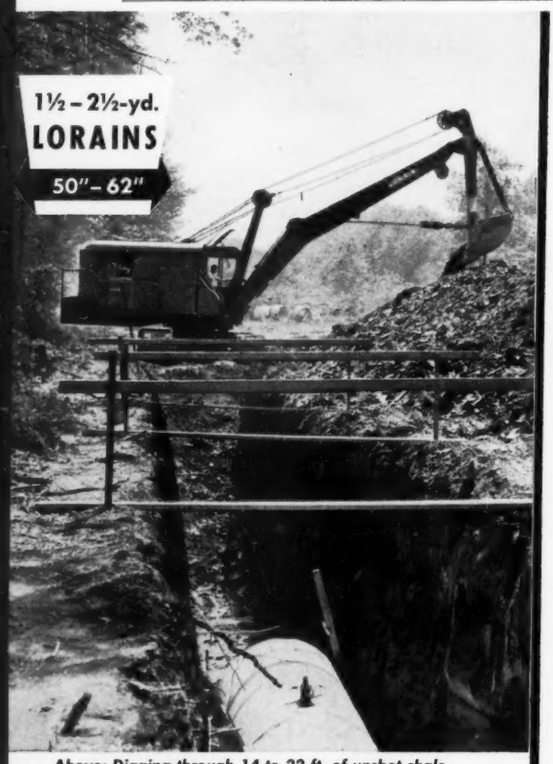
The following step-by-step description tells how a contractor built a beam for use in vibrating and striking off a 12-foot-wide concrete slab.

Because the beam length should be 1 foot longer than the span, a 13-foot beam—3 × 10 inches of vertical-grain D select O. G. Douglas Fir—was used. Since the crown on the bottom of the beam should be 1/64 inch per foot of beam length, the total crown at the center would be 13/64 inch. A nail was driven in at the 13/64-inch mark, and the line to be cut along was marked with a chalked string. A portable saw was then used to cut along this crown line.

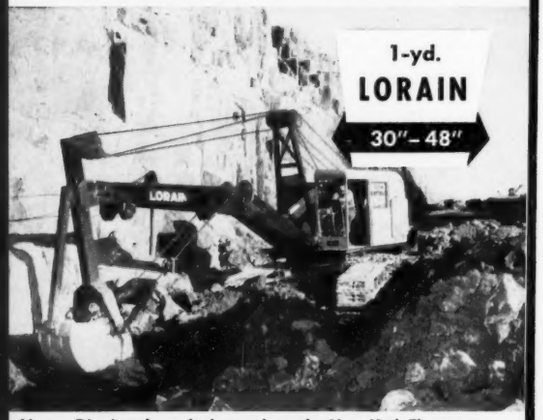
The bottom edge of the beam was then beveled with a plane so that the channel would fit snugly on the bottom.

The spacing of the holes for the vertical bolts was obtained from the Stow formula: bolt spacing S equals beam length in feet times 12, minus 70 inches, divided by the even number which results in spacing not over 25 inches. In this case, then, S equals 13 times 12 equals 156, minus 70 inches equals 86 inches, divided by 4

←For more facts, circle No. 374



Above: Digging through 14 to 22 ft. of unshot shale.



Above: Digging through shot rock on the New York Thruway.

Below: This Lorain digs sewer trench through 12 ft. of rock.

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A steel channel bolted to the bottom edge prestresses this shop-built screed beam. Holes being drilled through channel are for bolts which fasten channel to beam.

equals 21½ inches. The holes were then laid out on the channel, drilled with an electric drill, and countersunk to fit the heads of bolts.

Then the channel was clamped to the beam, and the vertical holes were drilled through the wooden beam. The special flat-head bolts furnished by Stow were inserted in the holes and drawn up tightly against the crown of the beam, prestressing the channel. A special clip was used underneath the nuts on one-half of the beam to hold the throttle control which runs from the engine to one end of the beam.

The brackets for the engine mounting were centered in the middle of the beam so that their top surfaces were flush with the top edge of the beam. After the brackets had been clamped in place, one hole was drilled, and the bracket was mounted and bolted in place to properly locate the other four holes. Then the other holes were drilled. The remaining bolts for the bracket were inserted and tightened securely.

Holes were drilled for mounting the rubber Chan-L Mounts on each end of the beam. Bolt heads on the end roller assemblies slid easily into the slots in these mounts and were tightened in place.

The Stow Power Pak, consisting of a vibrating unit powered by a 2-hp engine, was bolted to the brackets. Then roller-and-handle assemblies were mounted on the screed beam so that the handles extended to the left when facing the pulley end of the Power Pak. Before the mounting bolts that engage the vertical slots in the Chan-L Mounts were tightened, a ¼-inch shim was placed under each end of the beam. After the bolts were tightened and the shim removed, the rubber mounts let the beam down slightly so that there was about ⅛-inch clearance above the form. The throttle control was threaded through the clips and fastened to the throttle at one end and to the side of the end roller assembly at the other. The beam was then complete and ready to be put on the job.

For further information about building this prestressed screed beam write to Stow Mfg. Co., 40 Shear St., Binghamton, N. Y., or use the Request Card at page 18. Circle No. 137.

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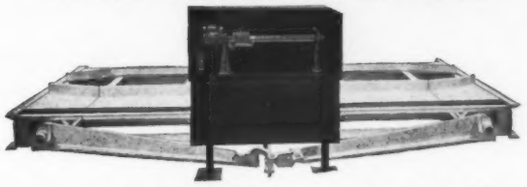

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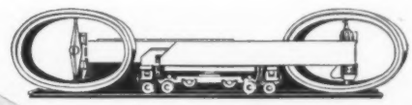

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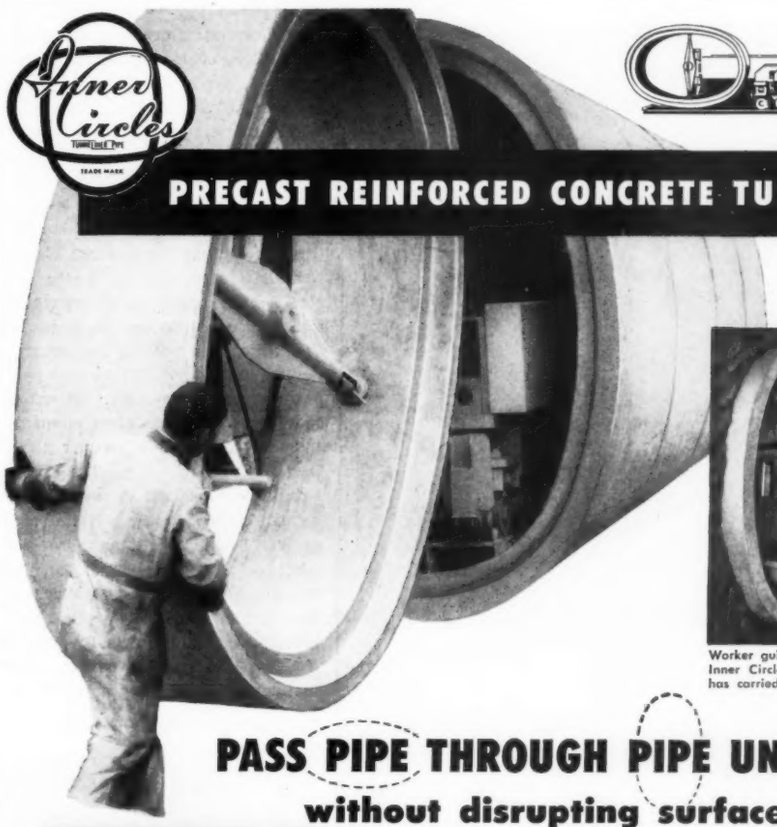

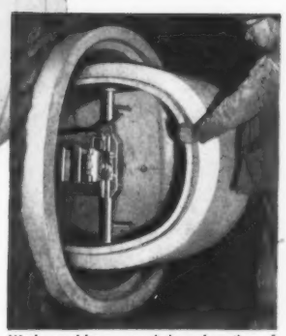

Worker guides an oval-shaped section of Inner Circle pipe which the Tunnelugger has carried through conduit already laid.

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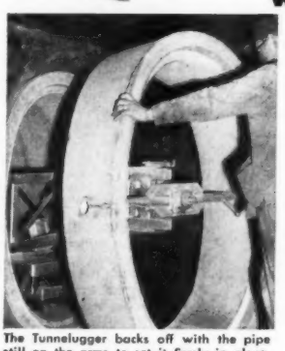

The Tunnelugger backs off with the pipe still on the arms to set it firmly in place, assuring an even, tight joint.

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The Barber-Greene finisher lays a 2-inch bituminous base course at Willow Run Airport, Detroit, Mich., as the hold-down device, consisting of 5-inch channels suspended by a chain, keeps welded wire fabric tight against the old pavement.

Improved methods facilitat-m

New device holds reinforcing in place under bituminous paver; wire fabric sheets are laid for 1,810-foot lane at one time

Two innovations in resurfacing techniques made a $160,000 bituminous-paving job at Detroit's Willow Run Airport move faster and smoother than would have been possible with conventional methods.

The first consisted of a device developed by Howell Construction Co., Howell, Mich., the contractor on the job, for holding wire fabric reinforcing tight against the ground while a lane of pavement was put down. The second innovation involved placing an entire lane of reinforcing at once, rather than placing just enough to keep the paver operating steadily.

Requiring almost 90 tons of welded wire fabric, and 14,000 tons of bituminous concrete, the resurfacing work actually served a double purpose. The University of Michigan, which bought the airport from the Defense Plants Corp. after the war and leased the commercial section to Airlines National Terminal Service Co., operates the airport as a research facility. Experimental parts of this job were part of its research program. The entire job, however, was designed to enable the airport to handle heavier plane loads and to extend the life of the original 6 to 8-inch concrete pavement. This had been put down early in World War II without reinforcement by the DPC as part of the Willow Run bomber plant, now the General Motors transmission plant. Appreciable cracking of the 10 × 20-foot concrete slabs meant that extensive maintenance was necessary. The resurfacing is expected to reduce the cost of this operation by about 70 per cent.

For the resurfacing, which includes the half-mile-long center taxiway and the 3,500-foot-long west ramp, welded wire fabric reinforcing of the 3-inch-thick bituminous concrete was specified to reduce the chances of the new surface cracking over the deteriorated sections of concrete.

From the intersection of the taxiway and the northwest-southeast and northeast-southwest runways, a 4-inch surface was laid without reinforcing for a distance of 575 feet. Then three sections, each 400 feet in length, were put down. The first consisted of 3 inches of hot-mix without reinforcing; the second, 3 inches of bituminous concrete with reinforcing; and the third, 3 inches of unreinforced pavement. The remainder of the taxiway was reinforced.

Reinforcing held down

The 9½-foot-wide and 8-foot-long steel fabric sheets were lapped 3½ feet across the first longitudinal joint of the area being resurfaced. Sheets for successive lanes were placed with a 6-inch clearance between sheets, so that all 10-foot-spaced longitudinal joints in the old pavement were covered by fabric. Transverse wires of the sheets faced downward, and at right angles to the direction of paving, so that the finisher, in effect, rode along the longitudinal wires. Sheets were fastened on the

Setting steel tunnel supports with hydraulic jacks saves time and money...

• **What's Going On Here?**—Look how these heavy steel crown rib tunnel segments are raised and held in exact position with 20-ton hydraulic jacks until the complete rib is in place and bolted together. One man governs the action of these jacks by operating remote control valves. If unstable ground conditions should be encountered another set of jacks can be quickly set up to provide immediate support to the roof, sides and face until the next rib can be advanced and set. Spacer angles bolted between the ribs locate and tie the ribs together into a composite labyrinth. Shallow-depth formed steel lagging plates bolted to the outside of the ribs furnish protection from spalls and provide a surface to support back packing.

• **What This Means for You**—Using the hydraulic jack method requires fewer men in the erection crew and ribs are set into place faster—erection cost is less. Erection equipment takes up less space because these jacks telescope into such a low shut height in their closed position and space in the heading of a tunnel is really at a premium. No stoppage in the mucking operation is necessary while the bore of this tunnel is being trimmed and the steel supports set. The whole cycle in driving and supporting the heading is speeded up and this means additional savings.

"Commercial", with a background of years of experience, designs and furnishes complete tunnel support systems using the strength of steel in its most efficient treatment. No matter which steel tunnel support products are recommended—ribs, lagging, spacer angles, wall posts and beams, liner plates, hydraulic jacks—because they are all made by "Commercial" you may be sure of a system that gives you the lowest cost benefit of every ton of steel used.

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① **SPUN END, ONE PIECE ROLLERS** . . . consisting of carrying surface and ends spun from a single piece of heavy gauge steel tubing plus an inner bearing tube welded to spun ends. Standard carrier, 4" diam., 5" diam. also available.

② **PERMANENTLY SEALED** . . . precision ball bearings are protected by a die-cast double labyrinth seal which will not corrode or wear, insuring protection of bearings from dirt and moisture.

③ **PRE-LUBRICATED** . . . sufficient grease is sealed into each roller to last the normal life of the carrier—Alemite fittings also provide for easy re-lubrication.

④ **INTERCHANGEABLE ROLLERS** . . . pre-adjusted 4" diameter rollers slide easily in or out of the hex-slots in the supporting brackets without tools.

Drawing shows spun end roller construction, die-cast labyrinth seals and precision ball bearings in position.

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...t-mix resurfacing of airport

four center longitudinal wires with hog rings.

The steel fabric was prevented from becoming entangled in the Barber-Greene finisher by 5-inch heavy-duty steel channels, one on each outside track, and three heavy-duty I-beams rigidly suspended between the tracks. These channels and I-beams extended from the hopper almost to the conveyor screw of the paver. As the Barber-Greene moved along, the channels and I-beams, fastened to the paver with chains at both ends, rode on the reinforcing and kept it flat.

The biggest difference between this and other hold-down devices, (see "Device Prevents Reinforcing from Catching in Finisher", C&E, September, 1954, pg. 5) was the double-ended turned-up ends of the channels and I-beams. Unlike previous devices which had to be detached while the paver was maneuvered into position for another pass, this one remained attached to the finisher while the Barber-Greene backed up and turned around, so that no time was lost.

The only delay in paving caused by the device occurred when one of the outside channels was bent up too high, allowing the reinforcing to catch in the feeder screw of the finisher. When this happened, the channel was bent down quickly, and paving work resumed.

With a Galion 12-ton roller following the Barber-Greene finisher, the paving spread achieved its best rate of production—1,330 tons of binder—at the north end of the west ramp. Here the finisher made six 10-foot-wide passes, turning at the end of a lane to pave in the opposite direction. On the second-best day, the paver put down 1,285 tons of materials.

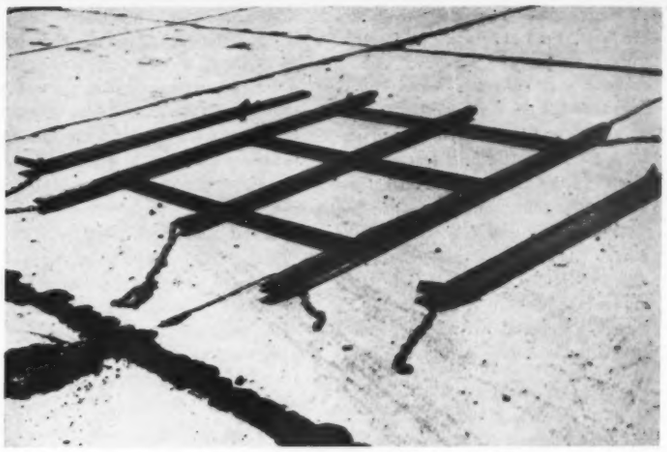
The asphaltic concrete pavement was put down in a 2-inch binder course consisting of 1¼-inch maximum stone, sand, and 120 to 150-penetration asphalt. This was followed by a 1-inch surface course.

Reinforcing laid at one time

On one 1,810-foot lane, Howell placed reinforcing in one operation. Usually, only enough sheets are laid and fastened to keep the job going, on the assumption that hot-mix trucks and other traffic will bend or distort the reinforcing. The new method proved very efficient, for the steel crew was able to work without being tied to the slow-moving paver. And since a quick-setting emulsion tack coat was placed over rather than under the steel, members of this crew were able to place the reinforcing without having to walk in the sticky material.

Before resurfacing started, about 45 of the badly cracked cement concrete slabs in the center taxiway were removed and replaced with air-entrained reinforced cement concrete. This taxiway, used by traffic moving between the terminal and the runway, showed signs of greatest use; hence, it was selected as a control

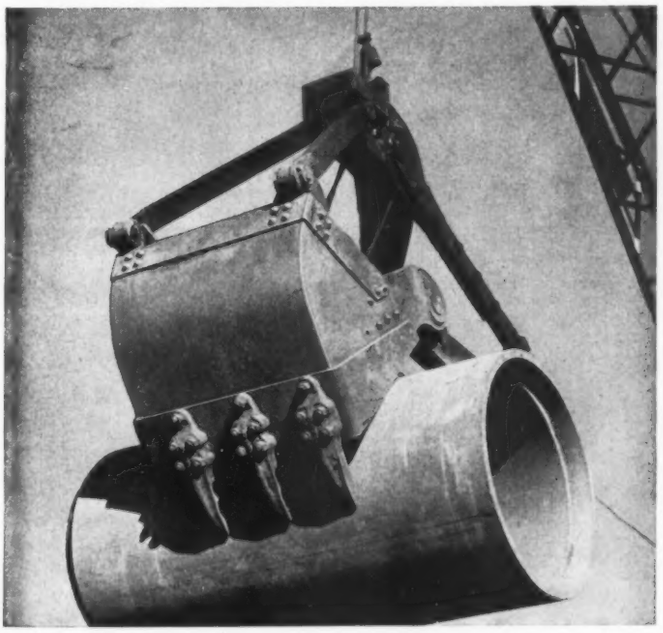
(Concluded on next page)



The 5-inch channels and the I-beams form the hold-down device. The channels ride outside the tracks; and I-beams, spaced with angles, inside the tracks. Chains hold the device in place and prevent lateral movement.

"OUR ERIE STRAYER BUCKET IS THE MOST VERSATILE TOOL WE OWN"

● **States Edward J. Petrillo, President, Edward J. Petrillo, Inc.**



On the job photo shows an ERIE bucket's no-slip grip on concrete pipe being moved at Edward J. Petrillo, Inc. on the New York Thruway.

The change-over from clamshell bucket to grappling hook costs time and money—to say nothing of the extra man needed to work the hook. That's where an ERIE bucket's versatility pays extra dividends.

Like Mr. Petrillo, many satisfied owners use their ERIE not just to dig and load sand and gravel, but to move boulders, sewer pipe, steel girders, concrete slabs, logs, and old lumber.

An ERIE Strayer bucket is nimble, too. Its great power is perfectly balanced and easily controlled. Operators appreciate this feature—especially when digging in corners, along edges or loading hoppers in tight quarters.

These better buckets provide these *"wanted"* features:

1. Top closing power from block and tackle, plus lever arm construction, plus precision balancing.
2. Manganese steel teeth and high carbon steel lips that bite up full payloads of even toughest clay and gumbo.
3. Rigid, one-piece, welded head that shrugs off bumps and jars. No wobble.
4. Two-line, continuous reeving. Adds up to 50% to cable life. Less down-time for reeving.
5. Low head room for fast work in tight quarters; low center of gravity for easy positioning.

ERIE BUCKETS THE WORLD OVER

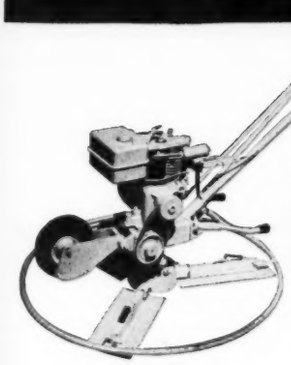
For catalogs, write Dept. CE 115 Cable Address: EXIMPORT

ERIE STRAYER CO.

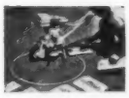
32115 GEIST ROAD ● ERIE, PENNSYLVANIA

For more facts, use Reader-Reply Card opposite page 18 and circle No. 382

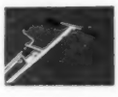
Only one man to move a White TROWELER



Retractable wheel, up to trowel, down to move.



Remove blades and ring in *seconds* . . . for cleaning, changing blades, or moving through doorways.



Adjust blade pitch *during* rotation from handle. Safety throttle control stops rotation if operator lets go handle.

PORTABILITY, patented, exclusive! PERFORMANCE, unbeatable! PRICE, comparable to trowelers *without* these features! Model T-1, 36" diameter, Patent No. 2,621,568.

White MANUFACTURING COMPANY

ELKHART 9, INDIANA

For more facts, use Reader-Reply Card opposite page 18 and circle No. 381

section. Other replacement of cracked slabs was done in the south end of the west ramp, where about 15 slabs were removed and replaced with a crushed aggregate base course compacted to 100 per cent density. Cracks in the original pavement were recorded so that the new sections can be checked to determine the effectiveness of the reinforcing in controlling future deterioration. Inspections made during the course of the job showed that the welded wire fabric had risen an average of ½ inch into the binder course, a point at which it will most efficiently minimize reflective cracking.

Even though work was closed down for several days due to airport operations and weather conditions, the entire resurfacing project was completed in 21 days. Howell Construction Co., was represented on the project by job superintendent Morley Durston. L. C. Beckert was project manager for the consultant, E. S. Brewer, Sons. Assisting with the planning of the project were J. P. Weidenbach, airport manager for ANTSCO; Floyd Wakefield, airport manager for the University of Michigan; and Prof. William Housel of the university's civil engineering department. The $160,000 job was partly financed by the Civil Aeronautics Administration, which paid $80,000 of the total cost. The remaining cost was shared equally by the Michigan State Department of Aeronautics and the University of Michigan. THE END

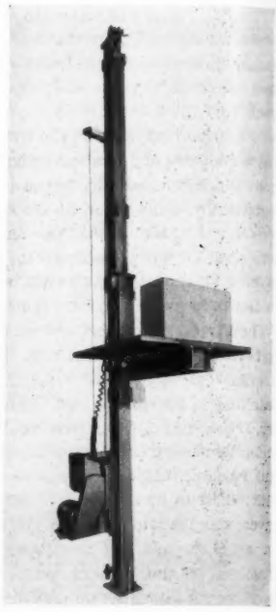
Ohio Turnpike installs two-way radio system

A two-way radio-communication system went into operation on the Ohio Turnpike last month. The system will provide round-the-clock contact between police, emergency, and turnpike authority personnel and the turnpike administration building in Strongsville. Of particular value to motorists will be speedier aid to temporarily disabled vehicles.

New one-ton hoist rides single column

■ A new type of material hoist, consisting of a platform which rides on a single column, can be completely erected by two men in 3 hours, according to Hawkeye Engineering Co., Inc., Syracuse 4, N. Y.

The Hawkeye hoist operates on a rigid vertical monorail that builds upon itself to any desired height. According to the company, it is simple to set up and operate, and can be dis-



The new Hawkeye hoist.

assembled quickly into units of 6 feet or less, making it easy to move from one location to another.

Because the Hawkeye hoist is so easy to move and rig, it is said to be ideal for hauling building materials aloft on construction jobs—particularly in areas where tower or other types of hoists would be impractical. It can also be set up in a pit or shaft to carry materials to and from below-ground level.

The vertical column is made up of 130-pound H-beam sections, which are lifted and mounted on the hoist's own platform. With the addition of a stabilizer bracket about every 18 feet, there is no theoretical limit to the possible height of the column. In rare situations where there is no adjacent support, the column can be held erect with guy wires.

The new hoist is operated by a 5-hp electric motor or a gasoline engine. It has a load capacity of one ton.

Outstanding features claimed for the Hawkeye hoist include the gentle self-leveling stops made by the platform, jolt-free starts, and smooth, stable action in transit. A safety lock automatically and positively prevents the platform from dropping, even with a full load, should the cable break. An emergency switch mounted on the carriage can stop all operations automatically. Safety limit switches automatically stop the platform at top and bottom extremes of the column.

For further information write to the company, or use the Request Card at page 18. Circle No. 15.

The American Road Builders' Association

invites you to Miami Beach to attend its

54th ANNUAL CONVENTION

EXHIBIT OF HIGHWAY MATERIALS and SUPPLIES

Both Meetings and Exhibits will be held in the

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JANUARY 11-14, 1956

The Nation's leading legislators, engineers, and road builders will address this Meeting—the most important in ARBA's history. Write to ARBA in Washington for information on hotel reservations and Exhibit arrangements.

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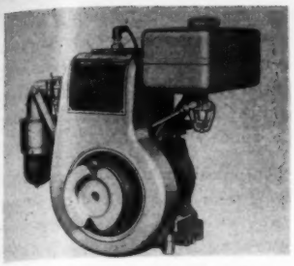


The Wisconsin Model BKN engine.

Announce new engine rated at 3.2 to 6.8 hp

■ A companion unit to the recently announced Model ACN heavy-duty engine is offered by Wisconsin Motor Corp. in the new Model BKN engine. Rated from 3.2 to 6.8 horsepower in a speed range of 1,600 to 3,600 rpm, this latest addition to the Wisconsin line is said to provide an extra power margin for the many types of equipment requiring horsepower within its range.

Entirely new in design, the Model BKN incorporates engineering features which are reported to result in a higher power output per cubic inch of piston displacement. Its 2⅞-inch bore and 2¾-inch stroke provide a displacement of 17.8 cubic inches, delivering top-rated power per cubic inch, according to the manufacturer.

The new engine can be furnished with various gear reductions, clutch assembly, electric starter and generator, or starter only, and can be equipped to operate on kerosene, butane, propane, or natural gas, although regularly supplied for operation on gasoline.

For further information write to Wisconsin Motor Corp., 1910 S. 53rd St., Milwaukee 46, Wis., or use the Request card that is bound in at page 18. Circle No. 122.

Three new representatives

Wooldridge Earthmoving Equipment, Sunnyvale, Calif., has appointed three additional district representatives as part of its long range expansion program, since the firm became a division of Continental Copper & Steel Industries, Inc., N. Y.

Edward D. Wallace will represent Wooldridge in Minnesota, Wisconsin, Iowa, Illinois, Indiana, Ohio, Michigan, and eastern Missouri. T. Robert Kyper will cover Oklahoma, Kansas, Nebraska, Missouri, and Arkansas, and Frank L. Johnson will operate in Arizona, California, Nevada, New Mexico, Utah, and Colorado.

EAGLE BREAKER BALLS

Available of abrasion, impact resistant Ni-Hard nickel-chromium-iron alloy for high breaking efficiency and tough semi-steel for regular jobs. Pear shaped, with easily replaced hook, in 5 sizes; 1500 lbs. to 8000 lbs. Spherical in 6 sizes; 1275 to 4350 lbs. Ask for Bulletin 952 on breaker balls, line weights, pile hammers.

Largest Manufacturers of Concrete Aggregate Washing-Classifying Equipment—Send for Catalog 55.

EAGLE IRON WORKS

159 Holcomb Ave., Des Moines, Iowa

For more facts, circle No. 383

New ditch tamping unit works in narrow trenches

■ A new Thor Triplex ditch tamper, which permits backfill tamping in trenches as narrow as 10 inches and operation at grade level in ditches up to 5 feet deep, has been announced by Thor Power Tool Co., 175 N. State St., Aurora, Ill.

The Triplex tamper, which mounts three Thor air-powered tampers, is operated by only one man. It features close-coupled design to permit tamping in narrow utility or foundation trenches. Handles on the unit may be adjusted both vertically and horizontally to allow operation at any level from the surface to a 5-foot depth.

For further information write to the company, or use the Request Card at page 18. Circle No. 5.

Heavy hauling trailers

■ Heavy-duty machinery hauling trailers available in models with up to 75-ton capacities are illustrated in a folder from Hughes Trailers, 1029 Brooke Blvd., Kenhorst, Reading, Pa.

Hughes trailers feature a tandem-axle assembly that has both longitudinal and crosswise oscillation. Also shown in the literature is an 8-inch brake available for this tandem axle.

An underside view shows the wide-flange main beams and the cross members that make the frame of Hughes trailers sturdy enough for heavy loads hauled over rough roads.

To obtain this literature write to the company, or use the Request Card that is bound in at page 18. Circle No. 193.

6″ Clearance to Replace 80 Ton Kiln Flue!

Accurate Control and Lifting Capacity Means One Machine Does Work of Two

When Maxon Construction Company, Inc. of Dayton, Ohio recently tackled a 335′ new kiln installation as part of the expansion of a large Southwestern Ohio cement plant, they discovered that work clearances were mighty tight—as little as 6″ at times! But with their Model 3900-A Manitowoc Speedcrane the extremely cramped working space proved to be a problem easily overcome.

During the kiln installation an old "downcomer" flue, weighing an estimated 80 tons, was removed by the crane with only inches of elbow room. While placing the new kiln sections, the Manitowoc was handling 37 tons on a 40′ radius and had to walk, carry, swing, twist and turn all at once. At no time did the machine or the load touch either of two buildings it was working between. Ordinarily, on a precise setting job of this type, two cranes equipped with slings are employed. Because of the restrictive space here only one unit could be used effectively in the working area. Maxon Construction Company, Inc. chose the Manitowoc 3900-A for this assignment, not only for its sure control, but also because of the machine's tremendous lifting capacity.

Outfitting the 3900-A with an extra heavy 90′ boom, the Maxon people used the precise maneuvering features of the unit to full advantage. Accurate, effective control was possible with the smooth-acting torque converter equipped with a dual governor. Power for all functions without jerking is steadily supplied by accelerator control only.

Two other outstanding features on the crane are the independent boom hoist and independent swing. The extra heavy, (Ball Bearing) worm-driven hoist gives the crane operator exceptional control when handling precise erection jobs such as the kiln section. By utilizing the independent swing, greater maneuverability is obtained through a separate set of smooth disc type clutches. Another important factor on this job was the positive crane stability necessary because of the restrictive working conditions. The Manitowoc's wide, 20′4″ long crawlers provided a steady base for all of the tight operations.

Handling up to 37 tons on a 40′ radius calls for a crane with exceptional maneuverability — that's a Manitowoc!

The next time you face a difficult handling job, be sure to investigate *all* of the famous Manitowoc field-engineered features. See your Manitowoc distributor for the full story or write for complete literature.

Manitowoc Engineering Corp.
Manitowoc, Wis.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 384

FACTS ON FINANCE

by WILLIAM HURD HILLYER

The increasing shortage of readily available money for construction and other purposes is clearly indicated in the price the U. S. now has to pay for short-time funds. Last month, the U. S. Treasury offering of $2,750,000,000 in 2¼ per cent tax notes, which absorbed a sizable proportion of cash in the banks, went at a steep interest markup. The rate on 91-day treasury bills, 1 per cent a year ago, has now passed 2.21 per cent—the highest rate since June, 1953. Investors in government paper seem to prefer the long-time obligations, such as the new 40-year 3 per cent bonds, which are more attractive in view of the increase in interest rates.

Borrowing outside the area of government has been so extensive that mid-October also saw the seventh successive rise in "banker's acceptance" interest rates, and this is being matched by the firmness in rates for other types of borrowings. All this is having an effect on heavy construction, via banks and the bond market, by depressing the market for public and corporate bonds. Loan demands and shrinking deposits have caused some New York banks to dip into "secondary reserves," which are now less than $1 billion. As of January, these amounted to $2½ billion. At the same time, banks are borrowing from the Federal Reserve System and selling bonds to raise cash to take care of their business customers.

A good sign, however, is the favorable reception which state and municipal issues are getting. The $69 million Richmond-Petersburg Turnpike 3.45 per cent bonds, taken in large blocks by insurance companies and other conservative investors, brought total October sales to $650 million, if the $50 milion New York Thruway securities and negotiated issues such as the $410 million Illinois Toll Road and the $130 million Texas Turnpike Co. bonds are included.

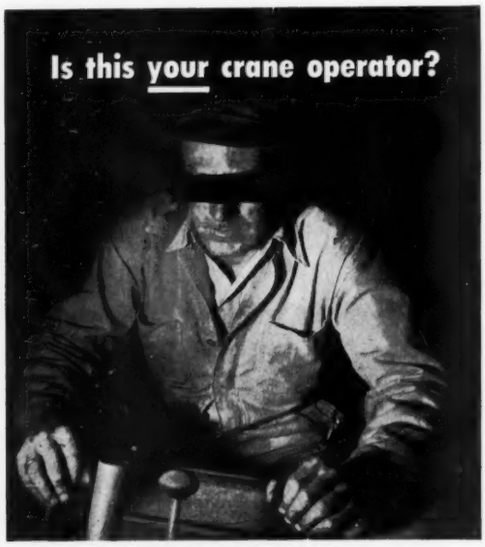
An unusual method of financing is being tried by the Allegheny County, Pa., Sanitary Authority for a huge sewage disposal system. The work will be paid for through a $100 million 2¼ to 2¾ per cent bank loan arranged by a banking group with Mellon National as its head. The loan will be repaid during the next four years from the sale of long-term authority bonds, permitting greater flexibility in financing than would have been possible if all the bonds were sold at one time. Proceeds of the loan will go to buy government securities, which will be put up at the bank as collateral. Portions of these securities will be sold from time to time and the money used to pay contractors. This will leave a gap in the collateral which will be filled by the sale of the authority's own bonds at the most favorable market opportunities. Mellon is quoted as figuring that about $1 million will be saved yearly in interest.

Revenue bonds are more than holding their own when it comes to public works financing. Official approval in October went to a number of issues, including $80 million in San Francisco Bay Toll Bridge bonds, $15.8 million of the sum to replace obligations outstanding on the Oakland Bay Bridge. About $31 million of accumulated tolls from the Oakland Bay structure will pay for a projected southerly crossing.

Not the price of money in terms of interest, but the problem of where money for all kinds of improvements is coming from is the chief concern of bankers at the moment. A spokesman for one of the country's largest banks says that "unless the savings stream holds up, the volume of money available to finance . . . roads, schools, factories" will be constricted. Bank savings had been piling up at the rate of about $1 billion quarterly, but lately less than one-third this amount has gone into savings. The most recently available Federal Reserve analyses show that all kinds of deposits in all banks are now some $3 billion less than at the end of last year. Part of this money, it is generally conceded, has gone into the stock market where the current readjustment should have a healthy effect. Despite increased rates and a general tightening of money, non-residential construction hit an all-time monthly high in September and the odds are that 1955 will wind up as heavy construction's best year on record.

Engineer districts changed

The San Francisco Engineer District now includes Lincoln and Clark counties in Nevada. The area was formerly under the Los Angeles district of the U. S. Army Corps of Engineers.



It might well be, if he lifts heavy loads by sheer guesswork — that is, without a

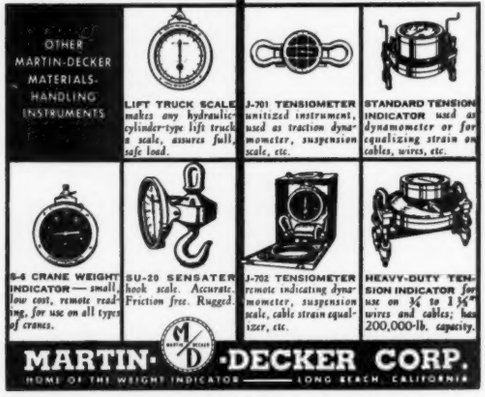
MARTIN-DECKER CRANE WEIGHT INDICATOR

The SB-10 Crane Weight Indicator warns your operator of an excessive load before he actually lifts it. Stops overtaxing equipment. Prevents costly accidents.

Merely by glancing at a dial a few inches from his controls, your operator instantly knows the weight, the boom radius, and the lifting capacity. He can tally weights while he's loading.

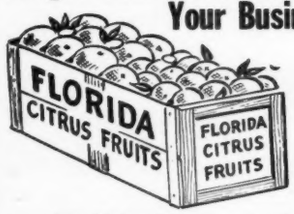
There are models for all crane capacities. For further information write Martin-Decker Corp., 3431 Cherry Ave., Long Beach 7, Calif., Dept. X-10.

The Martin-Decker SB-10 Crane Weight Indicator tells you (1) the weight you are lifting, (2) the boom radius, and (3) the lifting capacity at that radius.


OTHER MARTIN-DECKER MATERIALS-HANDLING INSTRUMENTS
LIFT TRUCK SCALE makes any hydraulic cylinder-type lift truck a scale, assures full, safe load.
J-701 TENSIOMETER unitized instrument, used as traction dynamometer, suspension scale, etc.
STANDARD TENSION INDICATOR used as dynamometer or for equalizing strain on cables, wires, etc.
SB-4 CRANE WEIGHT INDICATOR — small, low cost, remote reading, for use on all types of cranes.
SU-20 SENSATER hook scale. Accurate. Friction free. Rugged.
J-702 TENSIOMETER remote indicating dynamometer, suspension scale, cable strain equalizer, etc.
HEAVY-DUTY TENSION INDICATOR for use on ¾ to 1¾" wires and cables; has 200,000-lb. capacity.
MARTIN-DECKER CORP.
HOME OF THE WEIGHT INDICATOR — LONG BEACH, CALIFORNIA

For more facts, circle No. 385

Delight Your Customers Your Business Associates at CHRISTMAS



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. . . a Thrill for Everyone in the Family

Discover the value of giving fruit at Christmas. There's a warm place waiting for you in the hearts of your customers and their families. This year we have prepared a special EXECUTIVE GIFT arrangement of the most luscious tree-ripened Florida fruits. Fresh, golden, natural-color citrus fruit . . . sent direct from our own groves to your customer's door.

JUST SEND US YOUR LIST

There's nothing more to do. We'll take care of everything. Select packages of one variety or assorted as you prefer.

Full Box (90 lbs.) . .	$10.00
Half Box (45 lbs.) .	5.75
Full Bushel (55 lbs.)	6.75
Half Bushel (30 lbs.)	4.50

Prices include cost of shipping by railway express. Add 10 per cent for shipments west of the Mississippi River.

Discounts for Quantity Purchases — Satisfaction guaranteed on refund basis. Order with confidence. Now is the time to get started on your gift plans. **ILLUSTRATED FOLDER ON REQUEST.**

BRAUN FRUIT PACKERS Dept. C, Deland, Florida

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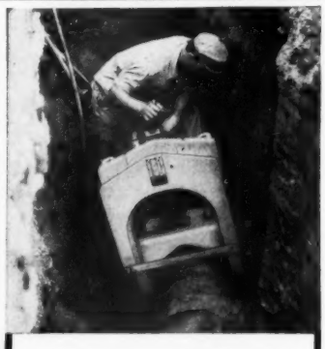
For more facts, circle No. 386



BIG GUILLOTINE

THE NEW WACHS

POWER PIPE SAW

No Flame — Safe Cuts Under Hazardous Conditions!

FASTER — SAFER — ACCURATE!

Cuts 10", 12", 14" & 16" Cast Iron and Steel Pipe

WACHS BIG GUILLOTINE SAW FACTS—

- Cuts Fast
- Cuts Clean
- Cuts Square
- Height 31"
- Width 31½"
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- Set up time, several minutes
- Power—electric or air motor
- Weight 312 pounds

Power Pipe Cutters from 2 Inch to 6 Foot Capacity

For further information write to:

THE E. H. WACHS COMPANY

1525 N. Dayton Street • Chicago 22, Illinois

For more facts, circle No. 387

New turbocharged diesels are rated at 250, 262 hp

The new Cummins NT-6 turbocharged diesel engine.

■ Production of two new turbocharged diesel engines is announced by Cummins Engine Co., Inc. Now available for automotive, off-highway, and other applications, the NTO-6 turbodiesel develops 262 horsepower, while the NT-6 turbodiesel is rated at 250 horsepower. Maximum speed of both is 2,100 rpm.

Essentially of the same design as the Cummins NH-600 200-hp diesel, both the NTO-6 and the NT-6 receive their increased power with the addition of a turbocharger. Both are six-cylinder, 4-cycle engines with a bore and stroke of 5⅛ × 6 inches and a piston displacement of 743 cubic inches. Compression ratio for both engines is 15½ to 1, while the weight for both is 2,546 pounds.

The company points out that fuel consumption per developed horsepower is maintained at a low level in both the Cummins NTO-6 and NT-6 turbodiesels because the heat used to drive the blower is not wasted as in other types of engines. The turbocharger does not absorb developed power as in the case of engines equipped with gear or belt-driven blowers.

Turbochargers on the NTO-6 and NT-6 engines are available mounted either on the side or top. In this way, various application requirements of power users can be met.

Some of the features of these two units include a fully counterbalanced crankshaft drop-forged from high-strength alloy steel, induction-hardened bearing journal, and steel-backed precision-type main bearings.

Standard equipment on the NTO-6 and NT-6 engines is the new Cummins PT fuel system. This system permits operation on all commercial diesel fuel weights, although No. 2 diesel or furnace oil is recommended for lowest operating costs. The water pump on both new engines is the circulating, centrifugal type, driven by two V-belts. The electrical equipment includes a 12 to 24-volt system with a 24-volt starting motor, 50-amp generator, series parallel switch, voltage regulator, and push-button starting switch.

For further information write to Cummins Engine Co., Inc., Fifth St., Columbus, Ind., or use the Request Card that is bound in at page 18. Circle No. 32.

Three-way excavator

■ Literature on its versatile Samson excavator, a hydraulically operated truck-mounted rig that is easily converted from shovel to backhoe to crane, is available from Avery Tractor, Inc., West Lebanon, N. Y.

According to this literature, the Samson represents important savings to the contractor because of its versatility, fast work cycle, and easy maintenance features. It is described at work on such operations as ditching, culvert laying, pavement removal, and road widening, and on various loading and unloading jobs. Complete specifications are given.

To obtain this literature write to the company, or use the Request Card at page 18. Circle No. 80.

Engineering firm moves into new quarters

Lockwood, Kessler & Bartlett, Inc., engineering and surveying firm has moved to new quarters at Syosset, N. Y. The new 25,000 square-foot building will house functions now carried on in three other offices in Great Neck and Manhasset, N. Y.

USE THIS HOSE ...for Your Toughest Drilling Jobs!

"HARDROK" Wire Braid AIR HOSE

Assurance of longer service life, with consequently lower replacement costs, recommends "HARDROK" wherever severest drilling conditions call for a truly super-strong air hose.

The carcass is made of horizontally braided steel wires, providing exceptional strength, durability and resistance to kinking, without impairing flexibility. The long-lasting Synplastic tube is impervious to the action of oil from the drill. The cover is a tough, wear-resistant yellow rubber compound. A black spiral stripe gives the hose a distinctive appearance for easy identification. Sizes ½" to 2", inclusive

Contact Our Nearest Branch for Details and Prices

GOODALL RUBBER COMPANY

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.

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Est. 1870

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TRULY PORTABLE!

- folds flat in seconds
- adjustable height and board angle
- sanded basswood board
- tubular-steel legs
- non-skid rubber feet

BROADWAY MANUFACTURING CO.
WAUKESHA, WISC.

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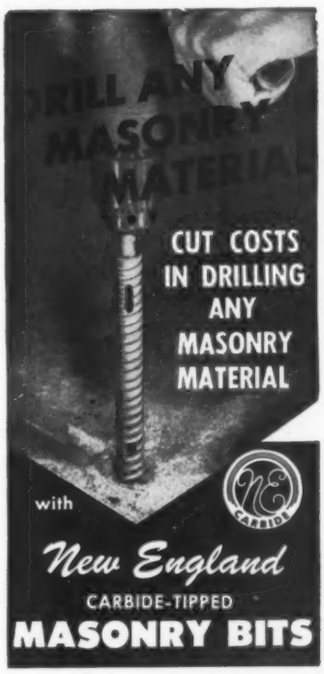

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Send for your FREE "What and How" Manual of Masonry Drilling. Shows you the right bit for any masonry.

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Though one of the 18-inch trunk lines on the access ramp is being used at this point, both will operate when the water level drops enough to require two booster setups for dewatering. The shovel on the ramp was one of the pieces of equipment trapped in the flooded quarry. *C&E Staff Photos*

Huge dewatering job gets flooded quarry into operation

Pumps work steadily to remove 600 million gallons of water from quarry inundated as a result of hurricane Diane

One of the largest dewatering projects ever undertaken was completed last month when 600 million gallons of flood water was removed from the quarry of Alpha Portland Cement Co's. Martins Creek Plant in Pennsylvania.

The plant proper, as well as the quarry, was inundated in about eight hours when hurricane Diane whirled through the Easton, Pa., area in August, causing Martins Creek to overflow its banks.

The creek, which separates the plant from the quarry, ordinarily runs between two steep banks approximately 25 feet high and flows at an average depth of 1½ feet. When Diane struck, the Delaware River rose to an all-time level, and its waters backed up into Martins Creek, raising its level about 30 feet above the banks. When the flood receded, 600 million gallons of water remained trapped in the man-made crater.

The circular quarry has a 33-acre area 52 feet deep, with a wide shelf at this level surrounding another 43-foot-deep hole of approximately 15 acres. All equipment working on the shelf—shovels, and hauling and drilling rigs included—were stranded when the flood struck and had to be completely overhauled when the water was removed.

Pumping is only solution

The job of removing the water from the quarry was given to the Griffin Wellpoint Corp., New York, N. Y., which moved in on August 26, setting two Gorman-Rupp 10-inch electrically operated centrifugal pumps on the quarry ledge to pump water from the quarry back into the creek. The next day, two more pumps, this time Griffin 12-inch Model 1210's driven by General Motors diesels, were spotted alongside the first two.

The four pumps discharged into the creek, approximately 30 feet from the quarry ledge, through separate 10-inch lines. As the water level in the quarry fell, what used to be an access ramp for the quarry was partially exposed. Two additional 10-inch Model 109 Griffin pumps were then placed as far down on the ledge adjacent to the ramp as the water allowed. A seventh pump was put to use when enough water was removed and a good setup located.

With the seven pumps working around the clock, a maximum of 29,300,000 gallons of water was removed from the quarry in a 24-hour period. In the early stages of dewatering, an average of 25 million gallons was removed every 24 hours.

As the water level fell and the discharge length of the 10-inch pipe was increased, the lines were made to feed first into a 12-inch-diameter trunk, and later into an 18-inch trunk. A P&H 20-ton truck-crane with a 65-foot boom handled the spotting of the pumps during the early stages of dewatering. Working from the ledge, the crane leapfrogged a pump over two others with each move, so that at least two pumps kept

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50 Years EXPERIENCE AS MANUFACTURERS OF CONTRACTORS'...

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- Simple in design, low on maintenance

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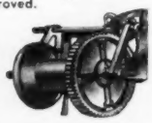
Swing stage type. Safest for suspended scaffolding. UL Approved.

HAND-POWERED WINCHES

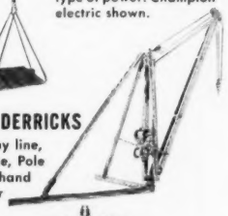


Safe worm or spur gear design. Sizes for 400 to 40,000 lb. load. No. 110 shown.

ROOFERS' CIRCLE SWING DERRICKS

360° operation. 500 to 2500 lb. capacities. Optional type of power. Champion electric shown.

STIFF LEG DERRICKS



All types—guy line, setter, A-frame, Pole and Tripod—hand and/or power operated.

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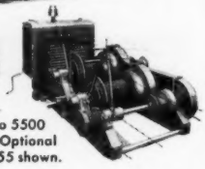

Single or double drum types with capacities from 500 to 5500 lb. single line pull. Optional type of power. DD55 shown.

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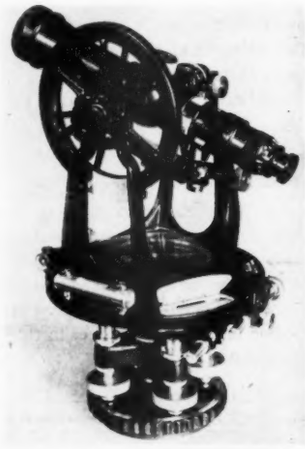

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TRACTOR SPREADER COMPANY

MANUFACTURERS OF THE JERSEY SPREADER

HASBROUCK HEIGHTS, NEW JERSEY

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A Browning truck-crane, working on the narrow shelf inside the partially empty quarry, leapfrogs a Griffin 12-inch pump into a position near the 15-acre 43-foot deep hole, while another pump, left, continues operation.

With another extension added, the suction line is lifted by the Browning truck-crane before being swung into position to work with the Griffin pump just to the rear of the cab.

operating while a third was being positioned.

Before the shelf became visible, the earth ramp was built up with rock and earth pushed ahead by dozers. On this ramp, the 18-inch trunk discharge, 280 feet long, was placed. When the water level reached the quarry shelf, the two electric pumps were removed, leaving only five to finish the job in the 15-acre hole.

Pump placing

Because of the lack of suitable locations for pumps, Griffin used four with the fifth as a standby. Once the shelf was above water, cement plant personnel moved in to repair the stranded equipment and resumed quarry operations.

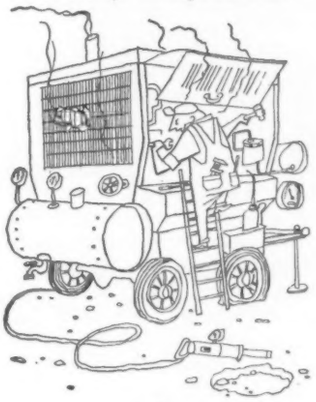
The biggest dewatering problem was finding suitable locations for pumps. The plans of the quarry were outdated, and the work of planning pump setups had to wait in many instances until the water level had gone down enough so that locations could be found. Soundings were taken many times to determine the existing topography of the quarry and to find sites that would make the best pump footings. The placing of pumps was handled by a Browning truck crane once the shelf was reached.

During the final operations Griffin used a booster setup to overcome the 150-foot dynamic head. This was done by having two 10-inch pumps feed into two 12-inch booster pumps located on the shelf. Normally the 12-inch pump has a 12-inch suction and a 10-inch discharge, but an adapter on the pump permitted a 12-inch discharge line to be used. Each booster pump, in turn, fed into two separate 18-inch trunks located on the previously prepared access ramp. At this time the 18-inch discharge was approximately 360 feet long. The actual maximum lift encountered was 101 feet with the dynamic hydraulic head being 150 feet. Suction line lengths were held to a maximum of 20 feet to reduce losses. The maximum length of suction line on the job was a 23-foot section on the 10-inch electric pump. This length had to be used to lower the water level so that pumps could be leapfrogged ahead to a suitable location. Before the dewatering was completed the seven pumps were moved a total of 28 times.

W. L. Anderson was the project engineer, and C. D. Manning the supervisor, for Griffin. Labor and equipment for handling pumps, pipeline, and earthmoving work were furnished by Alpha Portland Cement Co. This in itself was a problem, because the men had to be trained by Anderson and Manning. As soon as the shelf was reached, many of the men returned to their quarrying work. New men were shifted to the dewatering job from day to day. However, with pumps placed efficiently and the 24-hour operation maintained, the water was removed by October 8, exactly two weeks after the job began.

THE END

Why lose money with big, oversize compressors?



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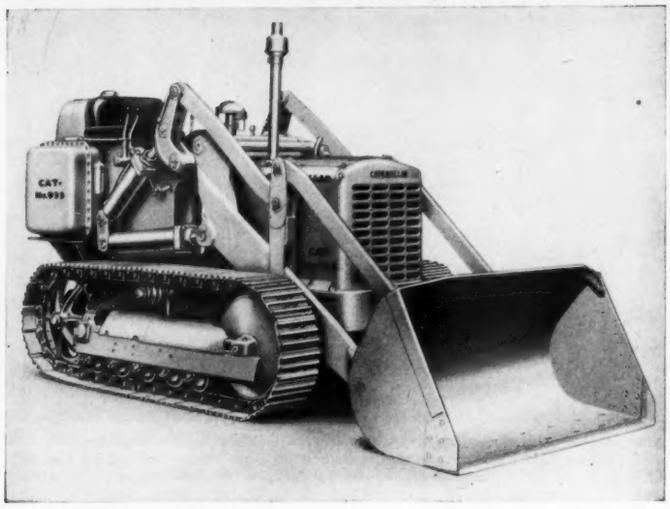


The Caterpillar No. 933 Traxcavator, newest in a line of Cat tractor-shovels, has a one-cubic-yard bucket.

New tractor-shovel has 1-yard bucket

■ The third model announced by Caterpillar in its expanding line of tractor-shovels is the new Cat No. 933 Traxcavator. Equipped with a 1-cubic-yard bucket, this newest unit in the Cat D2 crawler tractor class has been designed and built as an integral tractor-shovel.

Design features incorporated in the larger (1½-cubic-yard bucket) No. 955 Traxcavator are found in this smaller version. They include, besides unit design, 40-degree bucket tilt-back at ground level, high horsepower-to-weight ratio, improved hydraulic system, large lifting capacity, and good balance and stability.

Box-section track roller frames reportedly bring greater strength and rigidity to the new No. 933. A five-roller track frame and a 54-inch gage are used to insure good stability and weight distribution. A 37-section track chain, with 12-inch three-bar grouser track shoes, is used on the new model. Design of the one-cubic-yard bucket is said to give it the ability to load easily and fast, to retain its load without excessive spillage, and to operate over a maximum life span with minimum maintenance.

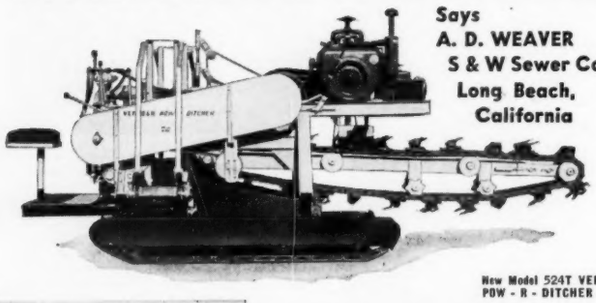
The vane-type hydraulic pump is driven from the front of the engine and is of ample capacity to permit simultaneous operation of bucket controls without loss of speed or power. In-seat starting employs either a gasoline starting system, equipped with 6-volt electric starting, or a 24-volt direct electric starting system.

The No. 933 has reverse speeds up to 264 feet per minute and four forward speeds up to 528 feet per minute. Over-all dimensions of this 50-hp unit are: length, 13 feet 10 inches; width 70 inches; height 75¼ inches; ground clearance 10 inches; weight, 15,750 pounds.

For further information write to the Caterpillar Tractor Co., Peoria 8, Ill., or use the Request Card at page 18. Circle No. 10.

"60% LOWER LABOR COST WITH MY POW-R-DITCHER"

Says
A. D. WEAVER
S & W Sewer Contrs.
Long Beach, California



New Model 524T VERMEER POW-R-DITCHER Above.

BIG DITCHER PERFORMANCE AT LESS THAN HALF COST!

Here's the heavier, stronger, more rugged ditcher that digs for less . . . because it costs so much less! The Vermeer Model 524T POW-R-DITCHER is ideal for contractors municipalities, utility companies, etc. Digs 8", 10", 14", 18" and 24" wide and down to 6 feet deep. Has 5-speed International Truck Transmission, hydraulically engaged steering controls. This self-propelled, one man operated ditcher is designed to handle wide foundation footings, gas, water and sewage lines at speeds of 1' to 15' per minute. Weighs 5,400 lbs. Get the facts now on this **low priced ditcher** that does the work of more expensive ditchers and trenchers . . . **at a fraction of the cost!** Smaller Vermeer Pow-R-Ditcher models also available. Write for name of distributor and complete details.

SOME EXCELLENT DISTRIBUTOR TERRITORY AVAILABLE

VERMEER MANUFACTURING CO., PELLA, IOWA

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WE'VE DONE IT AGAIN!!!

It's a Custom Built Cab for the new "PAYLOADER" Models HU, HH and HO.

The new cab offers even greater operator comfort than those dependable Campbell Cabs you have known before. The folding door opens into the top and affords easy entrance, also provides an escape hatch for emergency exit. The operator can open or close the door at any time regardless of the position of the "PAYLOADER" boom arms.

Ask your dealer about the NEW Custom Built Campbell Cab . . . or write:

CAMPBELL DETACHABLE CAB CO.
Wauconda, Illinois

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MULLER MIXERS *and* POWER TROWELS *set quality standards in their fields*

Muller's earliest objective—to make the best possible plaster and mortar mixer and sell it for the lowest possible price—was achieved by: (1) specialization on a few models . . . (2) careful selection of materials and components . . . (3) experienced workmanship . . . (4) sound distribution methods. Other Muller Machines, also, rank high in their fields for the same reasons.

PLASTER AND MORTAR MIXERS

Made in 2, 4, 6, 8 and 10 cu. ft. sizes. Electric motor or gas engine power. All models have Muller Lifetime Paddle Shaft Seal to protect bearings. Power throwouts on smaller models, built-in disc clutch on larger. Many other features. Priced $180 to $996 FOB Factory. Rubber scraper blades are available for all sizes.

CONCRETE MIXERS

3 models, 3 to 6 cu. ft. capacities, tilting type. Ample size drums, fast mixing action, Timken Bearings, electrically welded, sturdy construction throughout. Power—electric motor or Briggs & Stratton Air Cooled Engines. Prices $230 to $660, FOB Factory.

POWER TROWELS

4 sizes—24, 29, 34 and 44" dia., Briggs & Stratton Engines. Stationary guide ring eliminates hand troweling when finishing along baseboard. Engine speed regulated by governor control on handle.

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EXTENSION WOOD RULE

066 RED END

Similar to X-46 without brass extension and extra heavy sections. 4, 5, 6 & 8 ft. lengths.

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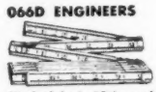

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Solid brass extension with black filled figures makes inside measurements easy. 6 foot lengths. Also available with "flat" markings or Folding End Hook.

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THE LUFKIN RULE CO., Saginaw, Michigan

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Invest in

U. S. DEFENSE BONDS

Now Even Better

The Niagara wet-cutting blade produces a chip-free edge as it cuts through tile block.

Masonry blades for both wet and dry cutting

■ A complete line of masonry blades for wet or dry cutting is announced by the Carborundum Co., Niagara Falls, N. Y. The Niagara line includes blades that will cut all types of brick, concrete products, stone, tile, and nonmetallic pipe, as well as asbestos, cement, gypsum, Transite, Masonite, Celotex, and similar materials.

Yellow blotters identify wet-cutting blades, manufactured of silicon carbide with a waterproof resinoid bond; blue blotters identify dry-cutting blades, also made of resinoid-bonded silicon carbide. The line also includes Carboflex glass-fiber-reinforced cut-off wheels that are said to combine fast cutting action with high strength. These wheels are specially reinforced to provide a high degree of safety, according to the manufacturer. Their knurled sides permit free cutting action without side binding.

For further information write to the company, or use the Request Card at page 18. Circle No. 195.

Planning and design book for 23 basic structures

Information to assist in programming and in making schematic and preliminary drawings for 23 basic types of buildings—from motels to churches—is contained in "Building Planning and Design Standards" published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y.

Written by Harold R. Sleeper, the book is a companion volume to "Architectural Graphic Standards" by Ramsey and Sleeper and "Architectural Specifications" by Sleeper.

Material in the book, drawn from bulletins, catalogs, and periodicals, is presented graphically or diagrammatically for easy reading. The book covers program data, special requirements, planning suggestions, and equipment for such structures as hotels, schools, theaters, stores, office buildings, air and bus terminals, parking garages, hospitals, churches, and numerous other types. The 331-page book is priced at $12 and may be ordered from the publisher.

Increased protection with new safety hat

■ Insulating headgear said to provide a new standard of protection for construction workers has been developed by E. D. Bullard Co., 275 Eighth St., San Francisco, Calif.

Originally designed to protect workers from electric shock and burn, the Bullard KV hard hat is also recommended as insurance against injury from falling or flying objects. The new hat is reported to have easily passed all tests listed in federal government specifications.

Fabricated of Estherene, a new plastic developed by the company, the Bullard KV hard hat weighs less than 14 ounces complete with elastic chin strap.

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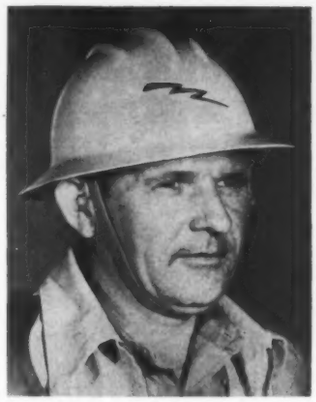

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★Just turn the high pressure hose on that heavy equipment for a quick clean-up. The solid, hard, driving, high pressure stream from a Hardie Powered Pump Unit will strip off the caked mud, grease, dirt—even that "behind the ears"—in a matter of seconds.

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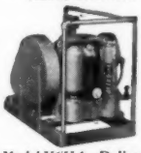
Enclosed unit. All working parts are readily accessible.

Model LC—Delivers 50 gpm at 800 psi.



Model XCVA—Delivers 18 gpm at 600 psi.

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Lays a Narrow Strip or Full Traffic Lane

Handles all granular materials — salt, cinders, sand, calcium chloride, rock chips. Spreads at speeds up to 30 M.P.H. Clutch-controlled flow: steady or intermittent for hills and intersections.

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LINDENWOOD, ILLINOIS

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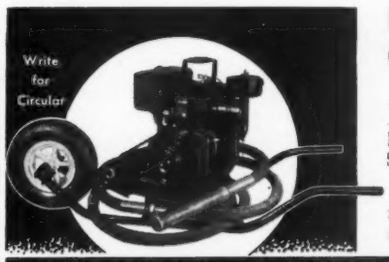

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. . . for concrete in large masses . . . bridges, dams, culverts, large sections of buildings. Seven H.P. Heavy Duty Engine.

Roeth Vibrator units have a reputation for long, trouble-free service.

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A clear liquid which penetrates 1" or more into concrete, brick, stucco, etc., seals—holds 1250 lbs. per sq. ft. hydrostatic pressure. Cuts costs. Applied quickly—no mixing—no cleanup—no furring—no membranes. Write for technical data—free sample.
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BUY used equipment
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MANUFACTURER MEMOS

Two new sales engineers for Economy Forms Corp.

Economy Forms Corp., Des Moines, Iowa, has appointed T. C. Kenna sales engineer for North and South Carolina, eastern Tennessee, and northwestern Georgia. Mr. Kenna's headquarters is located at 300 Clanton Road, Charlotte.

Lewis T. Morgan, new sales engineer, will service eastern Wisconsin, upper Michigan, and northeastern Illinois from headquarters at 2220 108th St., West Allis, Wis.

Both men will offer a complete metal form engineering service to contractors.

Joy Mfg. promotes

J. E. Douglas, former assistant district sales manager for Joy Mfg. Co., Pittsburgh, Pa., has been named district sales manager of the company's El Paso territory. A member of the firm for ten years, Mr. Douglas succeeds E. E. Miller, who has retired.

Robert B. Murray, Jr., newly elected vice president of the Baldwin-Lima-Hamilton Corp.

B-L-H elects three new vice presidents

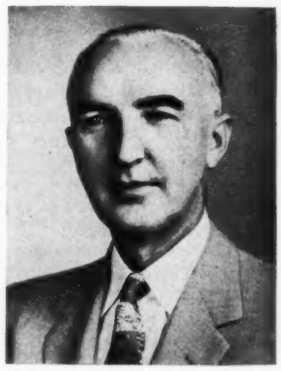
Robert B. Murray, Jr., former Undersecretary of Commerce under President Eisenhower, has been promoted to vice president of Baldwin-Lima-Hamilton Corp., and has been elected to the board of directors. Since he left his government post, Mr. Murray has been the assistant to the B-L-H president.

Other newly elected vice presidents of the company are James M. White, who is in charge of manufacturing, and John R. Martin, retired air force colonel, in charge of electronics and instrument operations.

Dandrow takes new post at Johns-Manville Corp.

The newly created post of vice president for customer relations at Johns-Manville Corp., New York, N. Y., has been filled by C. George Dandrow. Assuming his new duties on January 1, 1956, Dandrow will aid company divisions in sales of all products to the building-construction industry and other fields.

Dandrow, who has been general sales manager of the recently split J-M Industrial Products Division, will continue to serve as vice president of Johns-Manville Sales Corp. He has been with the firm for the past 33 years, and only this year retired as president of the New York Building Congress, a post which he held for three years.



Angus J. O'Brien, recently appoint vice president and director of engineering and manufacturing for Gar Wood Industries.

Gar Wood names O'Brien to new executive post

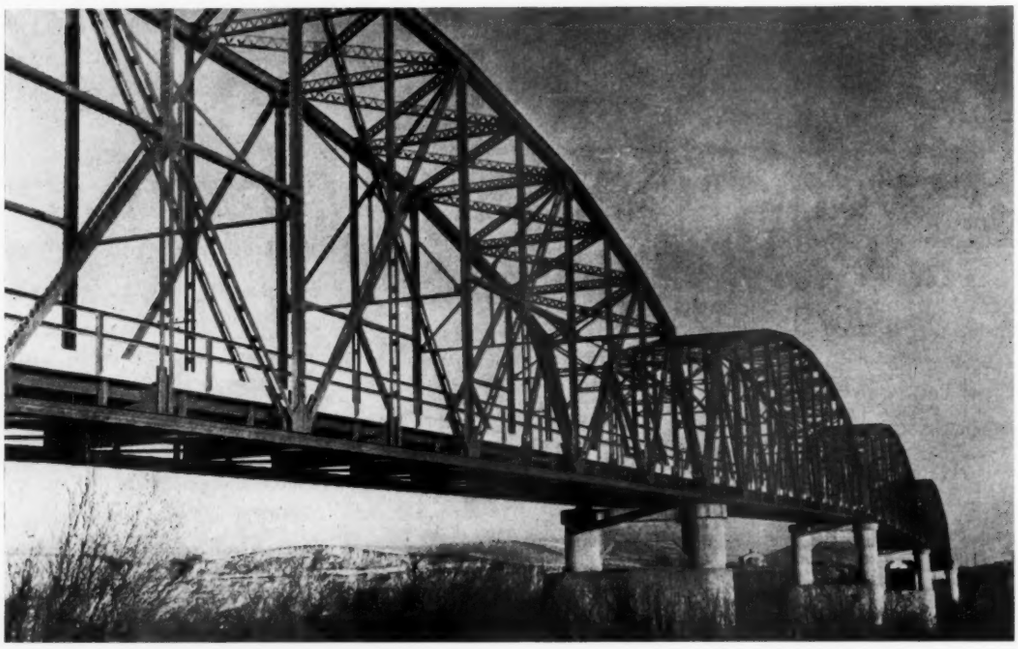
Angus J. O'Brien has been appointed to the newly created position of vice president and director of engineering and manufacturing for the Gar Wood Industries, Inc., Wayne, Mich., manufacturer of truck equipment and road building construction machinery. In his new position, O'Brien will be responsible for the integration of these two departments.

Duff-Norton appoints

Edward H. Hodgson has been appointed district sales manager for the state of Ohio by Duff-Norton Co., Pittsburgh, Pa. He will direct the sale of Duff-Norton jacks and hoists made by the firm's Coffing Hoist Division of Danville, Ill.

FOR SALE

BRIDGE and STEEL BUILDING



BRIDGE

Will be Available for Delivery Completely Dismantled and Matched-Marked November 1st 1955
LOCATED IN NORTH DAKOTA

4 SPANS 273 FEET EACH

19 FT. 6 INCHES
PANEL POINT TO PANEL POINT

23 FT. 10 INCHES
CENTER TO CENTER TRUSSES

DESIGNED FOR
A.A.S.H.O.

LOADING H 15
SPECIFICATIONS JUNE 1925

STEEL BUILDING

TWO STORY STRUCTURAL
STEEL BUILDING FOR SALE

Two-Story structural steel building 460' x 110' with a "Special Truss" trussed roof. Roof designed for a 40 pounds per square foot load. Second floor design load ranges from 325 pounds per square foot to 490 pounds per square foot. Exterior of building is covered with a combination of corrugated aluminum siding, pivoted shutters with sheet aluminum siding, and pale green resolite.

Available for delivery completely dismantled and match-marked IMMEDIATELY.

LOCATION NEAR HOT SPRINGS, ARK.

JOHN F. BEASLEY CONSTRUCTION CO.

STEEL ERECTORS

1614 Mercantile Bank Building
Phone RIverside 3228
DALLAS 1, TEXAS

20 N. Wacker Drive
Phone STate 2-7589
CHICAGO 6, ILLINOIS

P. O. Box 1624
Phone MUrray 7-6381
MUSKOGEE, OKLAHOMA

For more facts, use Reader-Reply Card opposite page 18 and circle No. 403

Fred B. Ray, the new vice president in charge of sales research and development for Insley Mfg. Corp.

Sales division promotions made by Insley Mfg. Corp.

Chief among the new sales division appointments at Insley Mfg. Corp., Indianapolis, Ind., is that of Fred B. Ray as vice president in charge of sales research and development. Until his appointment, the 34-year veteran of the firm was vice president in charge of sales.

R. J. Boatman, a factory sales representative before his promotion, has been named sales manager. He had been associated with the construction machinery business since 1926, and had been with Insley since 1949. C. W. Hoke, the new advertising manager, has been with the firm since 1953.

Poor & Co. division makes three appointments

The Crusher Engineering Division of Poor & Co., Philadelphia, Pa., has appointed Forest Neely, John Kessler, Jr., and John Dellevigne, Jr., to new positions within the organization.

Formerly director of engineering, Mr. Neely will become director of development. John Kessler, Jr., has been appointed chief engineer, and John Dellevigne, Jr., was made manager of parts service.

The Crusher Engineering Division, organized in May of this year, manufactures a line of hammer, ring, and impact mills, Bradford mills and breakers, and jaw and roll crushers. Forgings and special alloyed and manganese steel castings for maintenance and repair work are also made by the division.

Hyster names executives

Anthony A. Peck has been appointed to the newly created position of assistant to the president of the Hyster Co., Portland, Oreg. He will be responsible for special staff assignments.

Mr. Peck has served in executive and engineering capacities with both Vickers, Inc., and the General Motors Corp. Holder of a master's degree in mechanical engineering, he served as a naval engineer in World War II and the Korean conflict.

Joe W. Morgan has been named sales manager of the company's eastern factory equipment division, with headquarters in Peoria, Ill. He replaces R. E. Stiegele who has resigned.

Fuller names R. W. Firlik to sales research post

The transmission division of Fuller Mfg. Co., Kalamazoo, Mich., has appointed Robert W. Firlik to the position of sales research analyst. Mr. Firlik will evaluate and analyze the present transmission market, new market possibilities, and general business forecasts. He will also perform special research projects for the company.

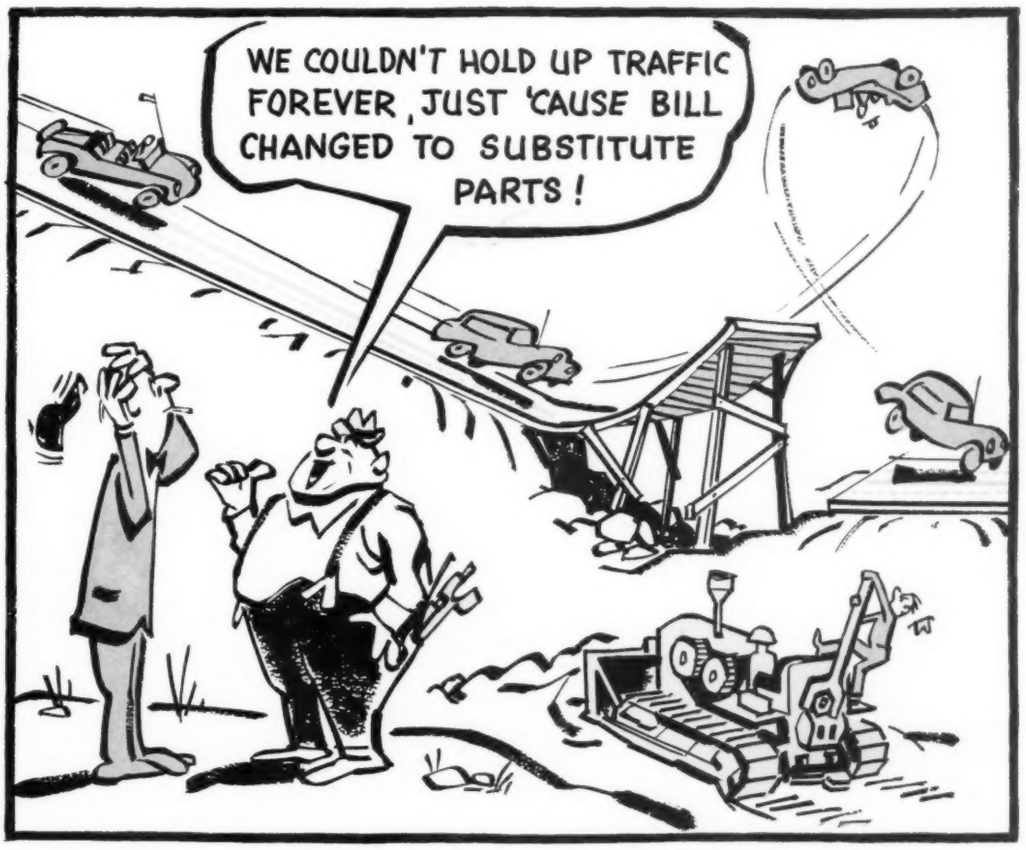
Sales engineers named by Harnischfeger Corp.

Two sales engineers have been appointed for divisions of the Harnischfeger Corp., Milwaukee, Wis., manufacturer of power cranes, shovels, and allied equipment used in construction. They are Jerald P. Moore, Jr., sales engineer for the hoist division of the P&H Cleveland office, and Robert H. Rand, sales engineer for the Pittsburgh, Pa., office of the construction and mining division.

McKiernan-Terry names division sales official

R. H. Nelson has been appointed assistant sales and service manager of the pile hammer division of McKiernan-Terry Corp., in Dover, N. J. A graduate of Dartmouth College, Mr. Nelson holds a master of science degree in civil engineering and is a member of the American Society of Civil Engineers and the American Concrete Institute. He will make his headquarters at the company's Dover office.

R. H. Nelson, assistant sales and service manager of McKiernan-Terry's pile hammer division.



Down time is no joke.

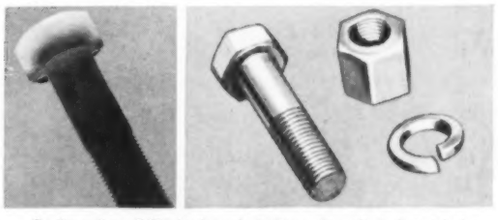
But it happens at times when track hardware gives out.

If you replace with genuine Caterpillar hardware, here's what you're sure of: bolts, nuts, capscrews and lock washers made from prechecked fine-grade steels, carefully hardened and tested, finished to the strictest specifications in the industry. You're sure of longer wear life, no matter how tough your jobs come. You're sure of *less* down time in the future.

If you replace with non-genuine hardware—can you be sure of anything?

Better get Caterpillar parts every time.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.



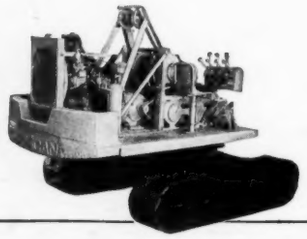
On the surface, CAT hardware looks like ordinary kind. But etched cross section of newly designed track bolt (left) shows depth of special "Hi-Electro" hardening penetration in bolt head.*

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 404

You get 7 tons of extra quality in the MICHIGAN ½-yard Crawler!



Compare specifications point-by-point—you'll call the MICHIGAN C16 *your* "best buy"

POWER CONTROL
INDEPENDENT TRAVEL
CAST STEEL DECK
POWER LOAD LOWERING
SIX HOOK ROLLERS
SEGMENT DISC CLUTCHES
CAST STEEL CAR-BODY
20" TRACKS STANDARD
30" TRACKS OPTIONAL

MICHIGAN is a registered trade mark of Clark Equipment Company

Have you ever compared a ½-yard crawler to a ½-yard truck-crane, as to design and construction? It's a smart way to buy, when you're in the market for a crawler—a good way to make sure you're getting the best value for your money.

Are these two—crawler and truck—the same as to their upper mechanisms? They are if they are Michigans—identically the same operating mechanisms, to the last bolt and nut, in the Michigan C-16 Crawler, rated 8 tons, and the Michigan TLDT-20 truck model rated 15 tons.

Seven tons of extra built-in quality for every user who picks a Michigan C-16 Crawler! You get the same rugged cast-steel machinery deck as the 15-ton truck crane; the same six big ball-bearing mounted hook rollers; the same air-powered clutches for fast precision operation. Right down the line, every part has that extra work-capacity!

Make your own point-by-point comparison—it will prove that the Michigan C-16 Crawler has *more "big machine" features as standard equipment than any other ½-yard crawler;* will prove that dollar-for-dollar you get more in the Michigan C-16.

See this outstanding machine in action—call your Michigan dealer or write us.

CLARK EQUIPMENT

CLARK EQUIPMENT COMPANY
Construction Machinery Division
384 Second Street, Benton Harbor 33, Michigan
Phone: WA 6-6184

For more facts, use Reader-Reply Card opposite page 18 and circle No. 405